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ST. LOUIS PUBLIC SCHOOLS

Organization and Administration

—OF—

High School Courses



EXCERPT FROM ANNUAL REPORT

1907-1908

BUXTON & SKINNER PRINTERS, ST. LOUIS

GIFT OF



ST. LOUIS PUBLIC SCHOOLS

Organization and Administration

—OF—

High School Courses



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BUXTON & SKINNER PRINTERS, ST. LOUIS

TO VNU
ABSTRACTS

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HIGH SCHOOL COURSES

This pamphlet is an excerpt from the Annual Report of the Superintendent of Instruction of The St. Louis Public Schools for the year 1907-08. The matter is issued in this form for the convenience of teachers, pupils, and other interested citizens.

Respectfully presented by
BEN BLEWETT,
Superintendent of Instruction.

Some five years ago, the Board of Education determined that the same opportunities should be offered to all the youth of the city in a way that would best avoid the false distinctions of intellectual or social value that result from segregating pupils in separate school buildings according to the different lines of work that interest and occupy them. During the last year it approved plans for equipping the Central High School with manual training shops for boys and girls, and thus put all our high schools in accord with the principle it had recognized as the correct one. The practical application of this principle has placed in reasonable proximity to all the pupils a high school offering to those attending it all of the opportunities offered in the other high schools of the city. In each of them, all of the groups of studies are given, and all of the labora-

tories and shops are supplied. In each of them, pupils taking different courses are grouped in the same classes in subjects common to the different courses. The social life of the school knows no distinction because of difference in choice of course of study.

Social institutions are not the *a priori* creations of the philosophers and statesmen, but shape themselves through a slow process of development. • They never can transcend in spirit or in practice the intellectual and moral state of the community of whose social life they are the organs. And thus the history of this institution in the United States shows many instances where temporary conditions or doubtful expediency rather than a carefully considered and comprehensive plan have dictated the organization and administration of the school. There are cases in which individual ambition or narrow local interests have determined the character of a school and the site it was to occupy, and this without due regard to its relation to the whole work or to the needs of the whole city. Thus Commercial High Schools, Technical High Schools for Boys, Technical High Schools for Girls, English High Schools, Classical High Schools, and all the other sorts have risen in their isolation quite as much as monuments to a new thought or to an influential individual, as in evidence of adaptation to a general need.

These apparently unrelated forms which the high schools have taken in the various stages of the development of the institution, while in some instances they have been the result of a too hasty or narrow consideration of the public needs, always and in common have had as their justification the conception of the public need that existed in the minds of those who established them.

The conception of the function of the high school that controls its present organization in St. Louis is that public schools of all grades are supported by the people because of their necessity in the training of the youth to efficient citizenship, and because this efficiency is the very life of social institutions.

To attain to social efficiency, the individual must develop proficiency in some form that will be useful to himself and to others. To attain to high social efficiency, he must be able to adapt his powers to the demands of changing conditions. Above all, his ideals of social relations and obligations must be right if he is to make proper use of his natural powers and acquired skill.

The individual may be trained to great efficiency in a particular occupation, and his work may be so specialized that he becomes a machine, with his faculties responding unconsciously to the accustomed stimulus in much the same way as the parts of a machine respond promptly and regularly and thoughtlessly to the impulse of the motive power. This training makes the best piece man, the man who is most like a machine, and who can most easily be replaced by a machine. His efficiency in his field of work approaches perfection, but in direct ratio to the narrowness of the field. Outside of his special field he may be as unfit for service as a plane would be if used to do the work of an auger.

The other kind of training looks to the bringing of all of the innate and acquired powers under the immediate control of the will. It expects each important action to be determined after reflection and judgment. If the individual is to attain and hold this control, he must not be governed by a habit that has atrophied the will.

The man who does nothing but drill holes becomes after years of such work quite unable to set himself to other work. The man whose occupation is so varied that he must always be able to recognize the new elements in the new situation and to apply his past experience in his handling of the new problem, goes to his work with powers unfettered by a particular habit. To use a homely phrase, he may be spoken of as an all round man.

The highly specialized training given by minute division of labor can not transmute its skill into skill of another kind.

From its very nature the training that gives adaptability can not give the high degree of mechanical skill produced by the training in one narrow occupation.

If by any means a high degree of specialized skill can be combined with adaptability, we have attained the efficiency in the individual that will be of most value to himself and to the state. Can this be done? This combination can be effected through the ideals that are created in acquiring the specialized skill.

Though skill in one occupation will not necessarily function in another occupation, still the ideal that has formed in connection with the acquisition of skill in one particular, will act as a powerful stimulus and guide in the shaping of habit in a new work. To take up the figure used before, skill in the use of the plane will not function as skill in the use of an auger. But if skill with the plane has set up the ideals of exactness and industry, these ideals will demand exactness and industry in the use of the auger. Adaptability is thus not an objective but a subjective condition, a condition in which the will faces new demands and deals with them as its ideals suggest. It is thus the highest type of efficiency, and ideals, next to will, are its most essential element.

Ideals are the outcome of experience and consequently expand in their scope with the expansion of experience. A youth living in the simple environment of the country or the village must necessarily have a different conception of the demands of life from that the city youth would have. This difference between the country youth and the city youth has its counterpart in the difference between youths coming from the varied conditions of life in the same city. If ideals are to be broad, they must be the outcome of broad experience.

The school, which dominates the formative period of the youth's physical and spritual life is naturally, in its organization and activities, an epitome of the adult life. It should bring before him in type at least the many things that engage the interest and activity of men in different walks of life. Its

life should show these interests and activities working together in mutual regard and in harmony. Its ideals in school work should expand into the ideals of morality. The exactness that requires a neat joint in the shops or an idiomatic translation in a language, should grow into the exactness in morals called honesty. Its ideals in school life should expand into those of a social democracy, which regards man finally not so much for the kind of things he does as for his motives and manner of doing it.

The specialized high school does not approach so nearly the conditions of society, as does the high school in which all of the courses are offered. It does not so well exemplify the complex life of the community or fit for responsible participation in that life. It does not give the best opportunity to observe and compare before making a choice of the work to be followed in after life. It gives false notions of other school work and other school people and lays the foundation of class distinctions that have no proper place in our republic. The high school that gives all the courses of study, by its very nature, best gives this breadth of experience and expansion of ideals. In such a school, the manual training or commercial boy sees in the boy digging in classic literature something that he admires and respects, and he himself gets hints of the value of interests beyond those that are immediately concerning him. The girl whose home management has kept her from the realm of the kitchen or from contact with the cares of the housekeeper until she has come to regard these things as of another world than her own, gets some new ideas of life by association with the girls of the domestic science course, whom she comes to know through her school. And the domestic science girl by her school associations learns to better appreciate the civilizing graces of literature and art. This kind of high school meets best the ultimate aim of the public schools. It gives the best training for social efficiency, because its training for special skill is accurate and still is not cramping, and because the varied experience it gives through its many-sided associations creates more comprehensive ideals, ideals

that serve best as aids to the will when action under new conditions is to be determined. This varied experience, moreover, gives, in addition to subjective adaptability, a better idea of the constitution of the social order and the rights and obligations of the individual in that order.

There are other arguments of a very practical nature in favor of this kind of high school. It is the plan most economical to the individual, 1. because, nearer to his home, he can have the kind of course he wants; 2. because a transfer from one course to another is made with less loss, should trial prove that he made a mistake in his first choice of a course of study. If equal opportunity is offered to pupils in all parts of a city, it will be more economical to the city to place all of the work in fewer large buildings, than in the larger number of small buildings that would be required were specialized schools erected in each of the high school districts of the city.

COURSE OF STUDY—NEED OF NEW COURSE.

The development of the work in the High Schools has kept pace with the increase in numbers and the provision of buildings and equipment. It is, therefore, not only fitting but urgent that the course of study pursued in the system of High Schools should be printed for the information of teachers, pupils, and all interested citizens. With this thought in mind, there was devised the past year a plan for the formulation of such a course of study as would represent the actual practice and such improvements as were desired by a majority of the teachers of the several subjects and approved by the principals later in conference and finally by the Superintendent of Instruction and the Board of Education.

PLAN OF PRODUCTION.

In each High School the teachers of each subject met for conference and discussion as often as was necessary to reach an agreement upon a statement for their subject, satisfactory to the majority. Later these statements were presented for revision by committees of three, consisting of delegates, one from each of the three High Schools, appointed by their

respective principals. The subjects taught were distributed among the principals, who were requested to act as chairmen of these committees of three, which were to consider the reports presented by the individual delegates from the three High Schools, and to formulate for each subject a single statement of the purpose, aim, and scope of the work. These statements, with such introductory remarks and internal changes as seemed desirable to the Superintendent of Instruction, constitute the High School Course of Study as it is presented in this report. In the preparation of this statement of the course of study, there was constantly kept in mind its threefold purpose, information of interested citizens of St. Louis and of other localities, guidance of new teachers unfamiliar with the work attempted, increased clearness and better definition of the conception of the immediate aim and ultimate purpose of the several subjects in the minds of all engaged in the actual work of the school room, whether as teachers or pupils.

COMMITTEES ON REVISION.

The organization of the committees on the High School course of study was:

W. J. S. BRYAN, Principal of the Central High School, Chairman of committees on:

Ancient Languages (Latin and Greek), Natural Sciences (Botany, Physiology, Physics, Chemistry, and Physiography), Social Sciences (Civics, Economics).

GILBERT B. MORRISON, Principal of the McKinley High School, Chairman of committees on:

History, Modern Languages (German, French, and Spanish), Manual Training, Mechanical Drawing, Domestic Science.

JOHN RUSH POWELL, Principal of the Yeatman High School, Chairman of committees on:

English, Drawing, Mathematics (Algebra, Geometry, and Trigonometry), Commercial Subjects (Penmanship, Arithmetic, Bookkeeping, Stenography, Typewriting, and Commercial Law).

COMMITTEES ON HIGH SCHOOL COURSE OF STUDY.

The membership of the Committees on High School Course of Study, made up of one delegate from each school for each subject, was:

ENGLISH, Jennie M. A. Jones, Central High School.

Philo M. Buck, McKinley High School.

Charles B. Goddard, Yeatman High School.

- LATIN**, Isaac N. Judson, Central High School.
Maynard M. Hart, McKinley High School.
Julia P. Benson, Yeatman High School.
- GREEK**, Isaac N. Judson, Central High School.
Maynard M. Hart, McKinley High School.
Cora V. Heltzell, Yeatman High School.
- GERMAN**, Herman F. Hoch, Central High School.
Ernst Wolf, McKinley High School.
F. J. Steuber, Yeatman High School.
- FRENCH**, R. A. Rocfort, Central High School.
Roberta McCulloch, McKinley High School.
Louise H. Fuhlhage, Yeatman High School.
- SPANISH**, J. E. Hahn, Central High School.
A. T. Haerberle, McKinley High School.
W. W. Hall, Yeatman High School.
- HISTORY**, J. S. Gochenauer, Central High School.
B. W. Billings, McKinley High School.
T. H. MacQueary, Yeatman High School.
- CIVICS**, M. W. Walker, Central High School.
H. R. Tucker, McKinley High School.
Robert A. Grant, Yeatman High School.
- ECONOMICS**, E. W. Mahood, Central High School.
Milton Frye, McKinley High School.
Thos. H. MacQueary, Yeatman High School.
- BOTANY**, G. M. Holferty, Central High School.
W. L. Eikenberry, McKinley High School.
H. C. Drayer, Yeatman High School.
- PHYSIOLOGY**, W. S. V. Siebert, Central High School.
Clifford Crosby, McKinley High School.
Wilbur N. Fuller, Yeatman High School.
- PHYSICS**, Stephen A. Douglass, Central High School.
Charles H. Slater, McKinley High School.
Wm. M. Butler, Yeatman High School.
- CHEMISTRY**, Chester B. Curtis, Central High School.
Robert Fischer, McKinley High School.
Fred. J. Jeffrey, Yeatman High School.
- PHYSIOGRAPHY**, G. M. Holferty, Central High School.
W. L. Eikenberry, McKinley High School.
Wilbur N. Fuller, Yeatman High School.
- MATHEMATICS**, Albert H. Huntington, Central High School.
Charles Ammerman, McKinley High School.
H. P. Stellwagen, Yeatman High School.
- COMMERCIAL STUDIES**, H. F. Pratt, Central High School.
C. M. Simcoke, McKinley High School.
R. A. Grant, Yeatman High School.
- DRAWING**, F. O. Sylvester, Central High School.
Louise S. Barbee, McKinley High School.
Augusta Finkelnburg, Yeatman High School.
- MANUAL TRAINING**, Kenneth R. Stephenson, Central High School.
Stanley H. Moore, McKinley High School.
R. A. Kissack, Yeatman High School.
- DOMESTIC ART AND SCIENCE**, Maud R. Flickner, Central High School.
Jennie W. Gilmore, McKinley High School.
Amanda Adams, Yeatman High School.

GENERAL AIM.

In the preceding pages, when discussing the natural development of the organization of high school administration, we found that organization changed with the changing conception of the aim of the work. We concluded that the aim recognized in the organization of our schools was the development in the youth of skill, adaptability, and controlling ideals.

AIM OF VARIOUS STUDIES.

How the various studies in our curriculum are used to this end is here given with little change from the reports submitted by the several committees. As an introduction to these statements the following tabular view of the courses of study is given. The course of study in subjects omitted at this time will be published later.

COURSE OF STUDY IN ENGLISH.

Time Allotment. The Course in English extends over four years with five recitations a week.

Scope. It comprises work in 1. Composition and Rhetoric; 2. Literature, including class reading and study of selected masterpieces, collateral reading, and a historical view of the development of English Literature; and 3. Public Speaking. These different phases are not presented as independent subjects, but are treated in their relation to each other in such a way as to emphasize the unity of the whole English Course, the general purpose of which is to equip for the needs of everyday life, and to lay the foundation for literary culture.

1. *Composition and Rhetoric.* The work in Composition and Rhetoric extends over the four years. It has two closely related aims: first, to give practical power in clear, simple, and forcible expression, both oral and written; and second, to develop the power to criticise and to appreciate the writings of others. In achieving this double aim the theory of Rhetoric is always co-ordinated with practical composition. Principles of Rhetoric are taught through actual practice, or are deduced from the writings of the masters, so that they may be clearly conceived and consciously practiced until they become habitual. Throughout the course the text-book is used for the study of principles, and constant reference is made to it for illumination and inspiration. In order that the pupil may regard composition as a necessary art, the work is arranged with careful reference to age and development, and in recognition of his tastes and interests. It progresses from the simplest and most general kinds of writing in the early terms,—interesting narrative and description, and very elementary exposition and argument—to the more difficult processes—complex narrative and description, and more advanced exposition and argument. The critical examination of the pupil's writing becomes more technical as the course proceeds.

The work in Composition and Rhetoric is reinforced by the study of types of literary masterpieces, which, in general,

are selected to correspond with the forms of composition studied in the respective terms.

2. *Literature.* The course in Literature presents three phases: *a.* Reading and study of selected masterpieces; *b.* Collateral reading; *c.* History of English Literature. The ultimate purpose of all three is the same: to create a desire for the best reading, and to cultivate power of literary appreciation.

a. Reading and Study of Classics. In order that the training in reading and understanding the classics may be balanced, both prose and poetry are studied each half year. The reading begins with interesting and, generally, obvious narratives, and passes through various more complicated forms until it reaches, in prose, the novel, the oration, the essay, and in verse, the longer and more mature poems, epic, lyric, and dramatic.

The assignment of the classics for the respective terms allows considerable liberty of choice. In the early terms more emphasis is placed on interest and appreciation than on analysis and interpretation. Mechanical study of details is undertaken only when necessary to create interest and appreciation. Later, as the pupil's powers of appreciation mature, his attention is directed to a closer study of the arrangement of the material and to beauty of style.

The pre-eminence of Shakespeare among writers of English literature is such that he should be given a unique place in the study of English, such a place as was assigned to Homer by the Greeks. His surpassing genius is recognized in the assignment of as much as two hours a week during the fourth year for the close and intensive study of his works. Then the greater maturity of the pupils and their knowledge of literature resulting from previous study of English classics give them power to appreciate more fully the depth and variety of thought and the perfection of language and form, and enable them to analyze the plays more keenly and to interpret them more adequately in terms of the life of today.

Excerpts from the plays may be used in earlier years as examples of various forms of composition, but the careful

study of the plays as such is reserved for the end of the course, when intellectual development and literary sensibility have reached a higher stage than at any previous time.

b. Collateral Reading. In order to acquaint the pupils with the large body of literature lying beyond the few masterpieces read in the class room, the course is enriched with as much supplementary reading as possible. As one aim of the collateral reading is to cultivate a taste for the best literature, the more nearly this reading of the best that has been written can be made a pleasurable exercise, the more nearly will it fulfill its purpose.

c. History of English Literature. A part of the last year is devoted to a study of the development of English Literature. The text book for this study is used as a work of reference; biographical and critical details are used only as they throw light on the books read and the periods studied. The chief emphasis is laid on the works of the authors treated. Both the collateral and intensive reading throughout the course are the materials out of which this study is developed. The object is to present English Literature as an organic growth from simple beginnings, through various periods dominated by increasingly complex ideas and activities.

3. *Public Speaking.* The practice in public speaking extends over the entire course. It includes the memorizing and speaking of selections from masterpieces of prose and poetry, as well as of original productions. The aim is to inspire confidence before an audience as well as to store the memory with the beautiful in style and thought.

The methods of teaching vary in all years and with all classes. The foregoing statement, however, lays down the general lines of study along which the student is taught to speak and to write effectively, to appreciate the great works of literature, and also to understand the relation of these masterpieces to their times and to the development of English literature. Such a course, as is here outlined, will lay the foundation for a literary culture that will satisfy the needs of every well ordered life.

FIRST HALF-YEAR.

Composition and Rhetoric. The special aims in this term are to gain spontaneity and pleasure in expression, and to establish habits of accuracy in mechanical form, grammatical sentence structure, and punctuation. Various kinds of writing. Letter writing.

Text-book: Brooks and Hubbard.

Literature. Class Study. A minimum choice of two classics from the following list, one prose, the other verse: Dickens' Christmas Carol; Longfellow's Tales of a Wayside Inn; Stories from the Odyssey; Old English Ballads. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

SECOND HALF-YEAR.

Composition and Rhetoric. The special aims of the first term still hold, but more attention is given to effectiveness in arrangement and expression. Elementary view of the whole composition and of the paragraph (Unity and Coherence). Elementary outlining (Logical arrangement). Figures of speech as an aid to vivid expression.

Text-book: Brooks and Hubbard.

Literature. Class Study. At least two classics, one prose, the other verse; Stevenson's Treasure Island. Irving's Sketch Book. Hawthorne's Short Stories. Translation of the Iliad. Macaulay's Lays of Ancient Rome. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

THIRD HALF-YEAR.

Composition and Rhetoric. Elementary study of Description and Narration. (Point of view, climax, vividness). Further study of the paragraph—(Structure and development).

Text-book: Brooks and Hubbard.

Literature. Class Study. At least two classics, one prose, the other verse: Scott's Kenilworth, The Talisman, Ivanhoe, or Quentin Durward. Dickens' Tale of Two Cities. Lowell's Vision of Sir Launfal. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

FOURTH HALF-YEAR.

Composition and Rhetoric. Exposition—(Definition, classification, clearness, coherence). Topical outlining.

Text-book: Brooks and Hubbard.

Literature. Class Study. At least two classics, one prose, the other verse: Webster's First Bunker Hill Oration and Washington's Farewell Address. Ruskin's Sesame and Lilies. Lamb's Essays. Arnold's Sohrab and Rustum. Coleridge's Ancient Mariner. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

FIFTH HALF-YEAR.

Composition and Rhetoric. Narration and Description. Plot-structure; character portrayal; selection and arrangement of narrative and descriptive details.

Text-book: Brooks and Hubbard.

Literature. Class Study. At least two classics, one prose, the other verse: George Eliot's Silas Marner. Hawthorne's House of Seven Gables. Blackmore's Lorna Doone. Tennyson's Idylls of the King. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

SIXTH HALF-YEAR.

Composition and Rhetoric. Argumentation and Persuasion. (Arrangement; emphasis.) Brief making

Text-book: Brooks and Hubbard.

Literature. Class Study. At least two classics, one prose, the other verse: Burke's Speech on Conciliation with America. Macaulay's Essays (selected), Burns' Poems (selected) and Carlyle's Essay on Burns. Platform Exercises (Public Speaking). Selections from masterpieces of prose and poetry.

SEVENTH AND EIGHTH HALF-YEARS.

Written exercises to correspond with the rest of the work. Systematic study of the forms of poetry and prose, reviewing forms already studied and supplementing wherever it is found necessary for completeness of survey.

Text-book: Brooks and Hubbard.

History of English Literature including special study of Chaucer, Spenser, Milton, Addison, and other authors found necessary for proper perspective and to complete the comprehensive view.

For reference: First View of English Literature, Moody and Lovett.

Intensive study of at least two plays of Shakespeare in each half year.

Five periods each week are devoted to the study of English. Two-fifths of this time is given to Shakespeare. The rest of the time is distributed among the other subjects assigned as the year's work.

CLASSICAL LANGUAGES.

Purpose of Study of the Classics. The ultimate purpose of the study of the ancient classic languages in the High School may be said to be five-fold: culture to be derived from acquaintance with classic masterpieces in the original and from the consequent intimate familiarity with the modes of thought and spiritual attitudes that characterize them, of which translation can reveal only such aspects as are transmitted unchanged through the medium of another mind; deeper insight into the civilizations that are the presuppositions of our own and consciousness of the inheritance of those elements of our own civilization which have come down to us from the Greeks and the Latins; illumination of English literature and language through a knowledge of classical allusions and derivation meanings; power to learn other languages because of their relation to the classic languages or on account of increased aptitude resulting from the mastery of Latin and Greek; mental discipline resulting from the repeated recognition and expression of the thought relations suggested by the form of words in these highly inflected languages.

COURSE OF STUDY IN LATIN.

Ultimate Purpose. The ultimate purpose of the study of Latin is: to train the mind through the acquisition of a knowledge of language structure in general; to lay a broad foundation for the study of other languages, especially the Romance languages; to acquire the mental discipline which Latin is peculiarly fitted to impart; and to gain the measure of culture the study of ancient masterpieces in the original gives. Only an inflected language can give a conscious grasp of the thought relation of words. Latin, through its perfect system of inflections, is admirably adapted to accomplish this end and is accordingly of great value in the study of English or any other language. The study of Latin literature is no less well calculated to aid in the acquisition of culture. It is the expression of a civilization which is the parent of our own and which has been characterized by a peculiar continuity. Some apprehension of this fact may be gained through the medium of history, but not such consciousness of it as comes through intimate acquaintance with original sources. Classical history and mythology, moreover, have entered into the very fabric of English literature. It is true, translations may serve to give a degree of appreciation, but only the Latin original gives the spirit of the Latin thought. Even as our civilization may be said to be a descendant of the Latin, so our vocabulary is largely of Latin origin. Hence only through the study of Latin can the significance and beauty of English words be fully appreciated.

Immediate Aim. The immediate aim of the course in Latin is: the acquisition of a working knowledge of the vocabulary, inflections, and constructions; actual reading acquaintance with selected portions of Latin literature; familiarity with the historical setting of those portions and the allusions found in them; recognition of the root words of English derivatives from the Latin; a sense of kinship with the Latins.

Scope. In the first year, naturally, the main stress is laid on the acquisition of the forms and simpler constructions of syntax.

These are illustrated by translating exercises from Latin into English and from English into Latin. A vocabulary of several hundred words is learned, selected mainly with reference to the future reading of Caesar. It is a great help in enlarging the Latin vocabulary to note the English derivatives. In connection with the vocabulary stress is laid here and all through the course on English cognates and derivatives and the formation of the Latin words themselves. There is kept in view the end of enriching the pupil's English vocabulary and of increasing his fluency in the use of English through the study of Latin. This work of the first year must be done with great thoroughness to insure future success.

In the second year, the reading is from Caesar's Commentaries, which require for their comprehension close study of forms and constructions. The vocabulary is largely increased, and difficult principles of syntax are studied systematically. The great significance of the conquests of Caesar, his wonderful civic career and tragic death, and the Roman military system, which made the Romans masters of the world, receive their due meed of attention. Here and all through the subsequent course in Latin important books for supplementary reading are urged upon the pupil's attention.

In the third year, six orations of Cicero are read, the four against Catiline, the oration for the Manilian law, and that for the poet Archias. In connection with the first five, the student may gain a deep insight into the history of that interesting epoch when the Roman republic was tottering to its ruin. In the Manilian Law, there is an excellent opportunity to study the oration in its most elaborate rhetorical form and to gain a knowledge of Rome's relations with states beyond Italy. In connection with the reading of the beautiful oration for Archias, pupils are introduced to the broad culture and the perfect literary workmanship of Cicero. In this year, the vocabulary is still further enlarged; forms and constructions are still insisted on, but more in connection with prose composition than with the text.

In the fourth year the first six books of Virgil's *Aeneid* are read. The attention to forms and construction may now be restricted mainly to matters of poetical usage, to the acquisition of new words, and the elucidation of difficult passages. The main stress is laid on the poem as a work of literature. The pupil is led to see in the poem a presentation of the glory and achievements of Rome. The versification is studied that the pupil may be led to appreciate the beauty of the lines in the original, and to this end some attention is given to the memorizing of striking passages. The life of Virgil, his relation to Augustus, his place in Roman literature, his influence on his own and subsequent ages and especially upon English poetry, are points to which attention is given.

Naturally all the matters which are touched upon cannot be mentioned in a brief statement such as this; but it may be confidently asserted that, if the pupil follows with reasonable success such a course as has been summarized, he gains valuable discipline and culture, whether or not he continue the study of Latin.

FIRST HALF-YEAR.

The work of the first half-year comprises:

Pronunciation.

Inflection of nouns, adjectives, pronouns, and verbs.

Syntax of commoner constructions.

Vocabulary,—about two hundred words used frequently in Caesar.

Illustrative exercises,—translation from Latin into English and from English into Latin; intelligible, expressive reading of Latin; connected translation.

Text-book: Collar and Daniell, "First Year Latin."

SECOND HALF-YEAR.

The work of the second half-year comprises:

Inflection of nouns, adjectives, pronouns, and verbs.

Syntax of additional constructions with review of constructions of the first half-year.

Vocabulary,—about two hundred words used frequently in Caesar.

Illustrative exercises,—translation from Latin into English and from English into Latin; expressive reading; connected translation.

Text-book: Collar and Daniell, "First Year Latin."

THIRD HALF-YEAR.

The work of the third half-year comprises:

Reading,—Caesar, Book I, omitting some chapters; supplementary reading in *Fabulae Faciles*; sight reading.

Inflection and meaning of words found frequently in Caesar.

Syntax,—important constructions found in Caesar.

Composition,—sentences composed of words found in passages read and illustrating principles of syntax studied.

Text-book: Caesar, Allen and Greenough.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

FOURTH HALF-YEAR.

The work of the fourth half-year comprises:

Reading,—Caesar, Books II, III, IV, omitting some chapters which may be read at sight.

Inflection and meaning of words found frequently in Caesar.

Syntax of important constructions found in Caesar.

Composition,—sentences composed of words found in passages read and illustrating principles of syntax studied.

Text-books: Caesar, Allen and Greenough.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

FIFTH HALF-YEAR.

The work of the fifth half-year comprises:

Reading,—Cicero, In *Catilinam* Orationes, I, II, III. Sight translation.

Inflection and meaning of words found frequently in Cicero.

Syntax of important constructions found in Cicero.

Composition,—sentences composed of words found in passages read and illustrating principles of syntax studied.

Text-books: Cicero, D'Ooge.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

SIXTH HALF-YEAR.

The work of the sixth half-year comprises:

Reading,—In *Catilinam* Oratio IV, De Imperio Cn. Pompei, Pro Archia Poeta. Sight Translation.

Inflection and meaning of words found frequently in Cicero.

Syntax of important constructions found in Cicero.

Composition,—sentences composed of words found in passages read and illustrating principles of syntax studied.

Text-books: Cicero, D'Ooge.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

SEVENTH HALF-YEAR.

The work of the seventh half-year comprises:

Reading,—Aeneid, Books I, II; sight reading.

Inflection of words having peculiarities of form.

Syntax of peculiar and poetical constructions.

Figures of syntax and rhetoric.

The principles of versification studied and applied.

Historical, mythological, geographical, and archaeological references.

Composition,—exercises in syntax and connected prose.

Text-books: Virgil, Greenough and Kittredge.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

EIGHTH HALF-YEAR.

The work of the eighth half-year comprises:

Reading—Aeneid, Books III, IV, VI, and as much as possible of Book V.

Inflection of words having peculiarities of form.

Syntax of peculiar and poetical constructions.

Figures of syntax and of rhetoric.

Versification,—the reading of Latin poetry, scansion.

Historical, mythological, geographical, and archaeological references.

Composition,—exercises in syntax and connected prose.

Text-books: Virgil, Greenough and Kittredge.

Complete Latin Grammar, Harkness.

Latin Prose Composition, Moulton.

COURSE OF STUDY IN GREEK.

Place of Greek. The course in Greek extends through the second, third, and fourth years. Pupils who have studied Latin for one year have the option of taking up Greek, and to such as have been interested and successful in Latin it offers a superior means of discipline, culture, and enjoyment. Its claims should be seriously considered by those who take an interest in ancient life and linguistic study and especially by those who desire to pursue the academic course in college. Such pupils can ill afford to ignore it.

Aim of Course. The immediate aim of the study of Greek is the acquisition of a working knowledge of its vocabulary, inflections, and constructions, reading acquaintance with selected occur in them, recognition of the root words of English derivations of classical authors, knowledge of the historical setting of these selections and comprehension of the allusions that

occur in them, recognition of the root words of English derivatives from the Greek, a feeling of kinship with the Greek people and a consciousness of having inherited their civilization.

Perfection of Language. The ancient Greeks were far greater intellectually and spiritually than the Romans, and their literature is correspondingly nobler and more inspiring. Ancient Greece developed the most faultless art the world has ever seen, and her language is declared by competent judges to have been the most perfect vehicle of expression the genius of man has ever devised. Even the young student can be made to feel this to a certain degree, and in an humble way to imitate it in the use of his mother tongue. As a means of training in exactness of expression, the ancient Greek is unsurpassed.

Sense of Beauty. The wonderful sense of beauty with which the ancient Greeks suffused their art appears in equal measure in their literature; and, in connection with the study of the language, as much use as is practicable should be made of pictures and casts, so that visual images may strengthen and fix the impressions produced.

Relation to other Languages. The relation of Greek to English is not so close as that of Latin; still there is enough of Greek in English to make this side of the study very profitable. The nomenclature of science is largely Greek; and this fact alone supplies an argument for its study. Latin and Greek are closely related languages, and comparison of forms and constructions of the two languages may be made with the advantage of fixing both more firmly in mind.

Scope. The order of emphasis should be: first, forms, the means of mastery in the acquisition of language; then construction, the grammatical relation of words expressed by the forms; then the content and literary interpretation, the ultimate objects sought. Progress, naturally, will be more rapid than in Latin, for the pupil has the advantage of one year's study of Latin when he begins Greek and would hardly have taken it up if he had not intended to do faithful work.

The Anabasis. After a sufficient drill in grammar and reader, four books of the Anabasis are read. The Anabasis is one of the most charming books that has come down to us from antiquity and never fails to interest the young student. One of its most marked characteristics is that it strikingly portrays the manly, independent character of the Greeks. In the assemblies of the army, the common soldier expresses his opinion with as much confidence as the general, which causes us to feel that we are in the presence of our intellectual ancestors.

Greek Philosophers. After this, short selections are read from Plato and Xenophon relating to the teaching and death of Socrates. This work is an addition to that usually done in secondary schools, where the course in Greek is planned simply with reference to admission to college. In this reading the pupil gets an insight into a most important side of the character of the Greeks, namely, their devotion to ethical and philosophical speculation, and cannot fail to be impressed by the lofty spiritual character of their great philosophers.

Greek Patriotism. Then about twenty-five pages of Herodotus are read, containing the stirring narrative of the first invasion of Greece by the Persians, which culminated in the battle of Marathon. Here is brought home to the reader, in the words of the father of history, that wonderful outburst of patriotism which hurled back the Persian invaders, saved European civilization from oriental despotism, and gave the impulse to the splendid development of the fifth century.

The Study of Homer. In the last half-year, four books of Homer's Iliad are read: here the pupil is brought to the fountain head of European literature and does not fail to appreciate the simplicity, directness, elevation, and purity of the great master of Epic song. The principal translations of Homer are briefly examined, and the pupil may see for himself how far all fall short of the original. Much mythology is learned and different theories as to the origin of mythology are examined. The recent discoveries of archaeology and the light which they throw upon the Mycenaean age are brought to the pupil's notice. The interesting and instructive matters which can be

treated in connection with the study of Homer are only limited by the shortness of the time allotted to it. Naturally the dialect is carefully studied and compared with the Attic; the versification is taught and several striking passages are committed to memory.

The work in Greek is more specifically as follows :

FIRST HALF-YEAR.

Pronunciation,—its general principles and their application, the laws of euphony.

Inflection,—nouns and adjectives, including contract forms, comparison of adjectives and adverbs, pronouns, and the regular verbs in omega.

Syntax,—uses of prepositions and their meanings with different cases.

Illustrative exercises,—translation of detached sentences from English into Greek and from Greek into English, teaching the more elementary principles of syntax.

Text-book: First Greek Book, Gleason and Atherton.

SECOND HALF-YEAR.

Inflection,—irregular nouns, and pronouns; contract, liquid, and *mi* verbs; word formation and derivation.

Syntax,—the several cases and common uses of the modes and of the participle.

Translation,—Xenophon's Anabasis, Book I, chapters I and II.

Illustrative exercises,—translation of detached sentences from English into Greek and from Greek into English.

Text-books: First Greek Book, Gleason and Atherton; Xenophon's Anabasis, Harper and Wallace; Greek Grammar, Goodwin.

THIRD HALF-YEAR.

Inflection,—review of declensions, principal parts and synopsis of important verbs.

Syntax,—constructions necessary for a clear understanding of the text read.

Translation,—Xenophon's Anabasis, Book I, completed, with attention to historical and geographical setting; sight translation.

Prose Composition,—detached sentences and connected passages involving the vocabulary of the text read and illustrating the common principles of syntax.

Text-books: Xenophon's Anabasis, Harper and Wallace; Greek Grammar, Goodwin; Greek Prose Composition, Pearson.

FOURTH HALF-YEAR.

Inflection,—review of forms.

Syntax,—constructions necessary for a clear understanding of the text read.

Translation,—Xenophon's Anabasis, Books II, III, and IV; much of the reading in III and IV at sight. Special emphasis placed on content.

Prose Composition,—detached sentences and connected passages, involving vocabulary of text read and illustrating the common principles of syntax.

Text-books: Xenophon's Anabasis, Harper and Wallace; Greek Grammar, Goodwin; Greek Composition, Pearson.

FIFTH HALF-YEAR.

Inflection,—review according to needs of class, study of the New Ionic dialect and word formation.

Syntax,—necessary to elucidate the text.

Historical setting,—enough of history, philosophy, and religion of the time to elucidate the text.

Translation,—twenty pages from Plato's *Apology* and *Phaedo*, and Xenophon's *Memorabilia*, and twenty-five pages from Herodotus.

Prose Composition,—sentences illustrating in a systematic way the principles of syntax.

Text-books: Greek Reader, Goodwin; Greek Grammar, Goodwin; Greek Prose Composition, Pearson.

SIXTH HALF-YEAR.

Inflection,—the old Ionic dialect, conversion of Homeric forms into equivalent Attic Greek.

Syntax,—Homeric constructions and those peculiar to poetry.

Versification,—principles of prosody and rhythmical reading.

Figures of syntax and of rhetoric.

Mythology, archaeology, legendary period of Greek history, influence of Homer on later poetry.

Translation,—Four Books of Homer's *Iliad*.

Prose Composition,—sentences illustrating in a systematic way the principles of syntax; connected prose based on the text of the *Anabasis*.

Text-books: Homer's *Iliad*, Books I-VI, Keep; Greek Grammar, Goodwin; Greek Prose Composition, Pearson.

MODERN FOREIGN LANGUAGES.

The value of modern language instruction in the secondary schools of this country is becoming more apparent every year, and it is assuming a correspondingly more important and dignified place in high school curricula. With the increased attention to modern language instruction there has arisen a higher standard of its aims and purposes.

Purpose. The purpose of modern language instruction is to give the pupil full command of the language studied for practical use in conversation, composition, and reading, and also to enable him to become acquainted with its literature. Through the study of foreign masterpieces, the mind is enriched and broadened, and the pupil becomes familiar with the manners, customs, and institutions of foreign peoples, and times other than his own. To many pupils a knowledge of a modern foreign language whether German, French, or Spanish, is valuable in business, while for others it is an accomplishment

of the greatest aid in foreign travel. To those who enter the professions, the ability to read a modern foreign language and thus keep abreast of the latest scientific thought in other countries is very helpful. Moreover, the study of modern languages in our high schools is of great disciplinary value.

For the attainment of these ends certain fundamental principles are recognized in the instruction. The language taught is used in the class room as much as possible, more and more as the course advances, and emphasis is laid on correct pronunciation and on fluency in reading and speaking. In the first stages, the conversational exercises based upon pictures, maps, and reading material are conducted with special reference to the acquisition of a working knowledge of the language studied. The study of grammar is continued throughout the course. Application of the fundamental principles is insisted upon.

In the study of composition, oral work precedes written work and receives the greater share of attention, so that forms, phrases, turns of expression, and content are familiar to the pupil, and his memory rather than his book becomes the storehouse from which to draw for his written work. Closely associated with the oral exercises, are written compositions based upon the reading selections and used as a fitting finish to the oral work. In the elementary classes this work consists of reproduction of proverbs or anecdotes, prose selections or poems; dictation exercises; questions and answers; reproduction with changes of person, number, or tense; paraphrasing, etc. In the advanced classes, compositions in the forms of dialogue, free reproduction, characterization, description, narration, and study of plot structure are some of the phases of the work. Incidentally, and as a means of bringing pupils into direct contact with the culture of the people and giving them the very best practical application of the language, those who have the necessary preparation are given an opportunity to correspond with pupils in the secondary schools of the country

whose language they are studying. Direct appreciation and interpretation of the language and literature without translation is the aim in all courses.

COURSE OF STUDY IN GERMAN.

Purpose. The ultimate purpose of the course in German is to bring the pupil into contact with the civilization and culture of the German speaking nations by giving him access to German literature. Power of direct appreciation and interpretation without the use of translation is requisite in preparation for the attainment of this purpose; the pupil gets the mental discipline peculiar to the study of foreign languages, and he receives training in the practical use of German, which is of special value to those who later follow scientific or professional pursuits.

Method. German is taught as a living language on a strictly grammatical basis. During the first two years the pupil receives thorough training in the fundamental principles of German grammar and acquires a working knowledge of the spoken language. In the following terms, the pupil's practical knowledge of grammar is enlarged as a means of attaining a clear understanding of the texts read or of acquiring power of oral and written expression.

The various forms of oral and written exercises grow out of the reading selections, with which they are correlated. They are also based on pictures and maps. In addition to these informal exercises, a prose composition book is used.

The reading material is selected with reference to its giving the pupil the elements of German life and culture, as well as with reference to its literary qualities. During the first two and one-half years, prose and poetry selected from modern German literature are studied, and the masterpieces of German classics are reserved for the last three terms of the four years' course. From the very beginning, pupils are introduced to various sides of German life and character, and to the geography, history, and institutions of Germany and other countries of German speaking people. For this purpose maps and pictures form important incidental aids.

FIRST HALF-YEAR.

During the first term the pupils have constant drill in pronunciation; they are taught to use the German script, and the first principles of elementary grammar are developed from simple German sentences. The grammatical forms and rules thus learned are applied in simple conversations between pupils, or between teacher and pupils, and in oral and written reproductions of the simple prose selections read in class. Pictures and the map of Germany are used to good advantage for various purposes. German proverbs and verses are memorized.

Text-books: Lehrbuch der deutschen Sprache, Spanhoofd; Glueck Auf, Mueller and Wenckebach.

SECOND HALF-YEAR.

In this term's work, the time is devoted principally to the continued study of elementary grammar. In addition to the work in grammar, easy selections of modern German prose and poetry are read and discussed. A number of poems are memorized. The use of pictures is continued, and by means of maps, the pupil's knowledge of Germany and the Germans is enlarged.

Text-books: Lehrbuch der deutschen Sprache, Spanhoofd; Glueck Auf, Mueller and Wenckebach.

THIRD HALF-YEAR.

During this term, the teaching of elementary grammar is continued. Much time is given to the oral and written reproduction of anecdotes and of simplified accounts of mythology and the legendary lore of Germany, and of the history of the new German empire. In this connection, a study is made of some of the most important national poems of historical content. Several of these poems are memorized. A systematic study of the map of Germany forms a part of the term's work.

Text-books: Lehrbuch der deutschen Sprache, Spanhoofd; Glueck Auf, Mueller and Wenckebach.

FOURTH HALF-YEAR.

Elementary grammar is completed; special attention is given to the participles and the subjunctive mode. A thorough study of a short story is made, in connection with which some of the German Folksongs are presented. Work in composition is correlated with the reading selection, and consists of free reproduction, the writing of chapters in dialogue form, character sketches, paraphrasing, etc.

Text-books: Lehrbuch der deutschen Sprache, Spanhoofd; German Reader, Hewitt.

FIFTH HALF-YEAR.

Two prose selections of modern German literature form the basis for this term's work. In connection with these selections, short sketches of the authors' lives and works are taken up. Questions and answers, dialogues, and free reproductions are some of the phases of the composition work. Principles of grammar are reviewed whenever it is considered necessary. During the last two years of the course, the work in grammar is systematized, so as to give the pupil training in the use of a standard grammar as a reference book.

Text-books: L'Arrabbiata, Heyse; Höher als die Kirche, Von Hillern; Prose Composition, Harris; German Grammar, Thomas.

SIXTH HALF-YEAR.

The reading of Lessing's *Minna von Barnhelm* is conducted so as to make clear to the pupil the development of the plot, the characters, and the motives. In connection with this drama, the life of Lessing and his general influence upon German literature are considered. Attention is given to the life of "Frederick the Great" and his connection with the "Seven Years' War." This work is followed by a study of some selection from modern German literature especially rich in the "realien." Much oral composition based on the reading material is required and is followed by exercises of various forms. Points of grammar are taken up as needed.

Text-books: *Minna von Barnhelm*, Lessing; *Der Schwiegersohn*, Baumbach; *Prose Composition*, Harris; *German Grammar*, Thomas.

SEVENTH HALF-YEAR.

To develop a deeper insight into the beauty and the spirit of the drama, a general study of Schiller's life and work is taken up in connection with the intensive study of "*Wilhelm Tell*." Composition work is correlated with "*Wilhelm Tell*" and is planned to develop the pupil's power of appreciation and interpretation of the drama, and to give him ability in expressing himself in connected discourse on the content of the text. Description, character sketches, and the development of plot structure furnish subjects for composition.

Text-books: *Wilhelm Tell*, Schiller; *Das Lied von der Glocke*, Schiller; *Prose Composition*, Harris; *German Grammar*, Thomas.

EIGHTH HALF-YEAR.

A thorough study is made of Goethe's *Hermann and Dorothea* as an epic poem, and its sources and characteristic literary qualities are considered, so as to develop the pupil's power of appreciating historical, literary, and aesthetic values. Goethe's life and his influence on German literature are studied. Much oral work is required on the contents of the various songs, followed by written compositions in the form of description and narration based upon the text. Hauff's *Lichtenstein* is used for rapid reading during the latter part of the term and oral reports on the contents are required.

Text-books: *Hermann und Dorothea*, Goethe; *Lichtenstein*, Hauff; *Prose Composition*, Harris; *German Grammar*, Thomas.

COURSE OF STUDY IN FRENCH.

Method. From the beginning careful attention is given to the spoken language. As the difficulty of the pronunciation of French is recognized, stress is laid on this part of the work. Reading aloud is regularly practiced in class, and questions on the reading exercises are asked by the teacher or the pupils and answered in French. Dictation forms an important part of the work throughout the course, as does also the memorizing of

both prose selections and poems. Carefully graded composition to suit the vocabulary of the pupil is a part of each exercise. French is gradually introduced as the language of the class room.

FIRST HALF-YEAR.

The elements of grammar are studied; the articles, the partitive, the possessive and personal pronouns, adjectives, the formation of the plural, the present and past indefinite of regular verbs, the auxiliaries and a few other irregular verbs. The reading exercises present in an interesting manner the principles of each lesson, as they form connected paragraphs. These the pupil can use in free composition in addition to the set translation from English into French. Conversation is first based on these little stories as is also the dictation work. Additional conversation and composition material is found in one of the Conversational Wall-pictures and in the sight reading.

Text-books: French Grammar, Fraser and Squair: pp. 1-55. Contes et Légendes, Pt. I.

SECOND HALF-YEAR.

The work begun in the first term is continued in this term. The elementary grammar is nearly completed. All verb forms are studied excepting the past indefinite of the indicative and the imperfect subjunctive, and the pupil becomes familiar with these forms in his reading. The various pronoun forms are taken up this term. The prepared reading in the grammar is supplemented by sight reading, which furnishes the basis for conversation, dictation, and composition. The maps of France and of Paris and another Conversational Wall-picture supply additional material.

Text-books: French Grammar, Fraser and Squair, pp. 56-89. Contes et Légendes, Pt. II.

THIRD HALF-YEAR.

More time is given to prepared and sight reading. The prepared reading is standard short stories, and the exercises connected with the last lessons of Part I of the grammar. Historical allusions found in the reading suggest interesting supplementary work. Idioms, found in the stories or suggested by them, are learned. The composition work is freer. Irregular verbs are studied as they are needed.

Text-books: French Grammar, Fraser and Squair, pp. 89-116 and 398-422. Le Tour de la France par deux Enfants.

FOURTH HALF-YEAR.

A story is carefully studied this term. The reading is prepared with a view to translating the story if necessary, though the aim of the class work is to read and discuss the story in French. A college play is used as sight reading. Conversation and composition work is based largely on reproductions of scenes in the story or the play. A few themes on outside subjects and letter writing vary the work. The study of idiomatic expressions is continued. A thorough study is made of irregular verbs, with abundant exercises for drill.

Text-books: French Grammar, Fraser and Squair, pp. 117-128 and 337-344. La Mare au Diable, Sand. La Joie Fait Peur, Girardin.

FIFTH HALF-YEAR.

This term a story and a college play furnish prepared and sight reading as well as material for conversation and composition. The reading is prepared as in the preceding term. Much time is given to oral as well as written reproduction by the pupils.

A systematic study of syntax is begun, filling out the elementary work of the first years. Special attention is paid to the use of the tenses and subjunctive, with exercises for drill.

Text-books: Grammar, Fraser and Squair, pp. 163-199 and 344-360. Colomba, Mérimée. La Poudre aux Yeux. Labiche and Martin.

SIXTH HALF-YEAR.

Victor Hugo's *La Chute* from *Les Misérables* offers to the pupil more difficult reading and an opportunity to enjoy a masterpiece in the original. Besides the work in the language there is much material for thought in the extract. Selected short stories furnish sight reading. Frequent oral and written reproductions are made. Sight reading is continued in class, and supplementary reading outside of class is required, reports being made in class.

The work in the grammar is continued and includes the infinitive; participles; feminine, plural, and comparison of adjectives; plural of nouns and the article.

Text-books: French Grammar, Fraser and Squair, pp. 199-262, 360-371. *La Chute*, Victor Hugo. *Short Stories*, François Coppée and Maupassant.

SEVENTH HALF-YEAR.

An historical sketch and a comedy introduce the pupil to the French classics. Characters are assigned, and the plays are read and discussed in class. Summaries of scenes, characterizations, and subjects suggested by the reading form material for conversation and composition. Certain epochs of French literature are studied this term with extracts from the authors as far as possible. The sight and supplementary reading is continued as in the preceding term. Grammar is reviewed in a "Grammaire Française," and a systematic review of French Prose composition is begun.

Text-books: *La Troisième Année de Grammaire*, Larive et Fleury, Jeanne D'Arc, Lamartine, *Advanced French Prose Composition*, François, *La Littérature Française*, Duval. *Les Précieuses Ridicules* or *Le Bourgeois Gentilhomme*, Molière.

EIGHTH HALF-YEAR.

The study of French classics is continued in *Le Cid*, one of the most beautiful masterpieces. It is read and discussed, and the passages most familiar to French students are committed to memory. The supplementary reading is from modern authors. Oral and written compositions again take important places.

The survey of French literature and the review of French grammar and composition are continued. French is the only language heard in the class room.

Text-books: *La Troisième Année de Grammaire*, Larive et Fleury, *Advanced French Prose Composition*, François, *La Littérature Française*, Duval. *Le Cid*, Corneille.

COURSE OF STUDY IN SPANISH.

Purpose of Course. On account of our proximity to Mexico and the countries of Central and South America, and on account of the rapid increase in the social and trade relations which exist between these countries and the United States and between the United States and recently acquired territories, where the Spanish language is spoken, it may be said that the special purpose of the Spanish course is to make the Spanish language available to pupils as a means of communication for business purposes. For this reason, a great deal of time is devoted to the commercial side of the language; business letter writing, the geography, natural resources, products, and industries of countries in which Spanish is used, are given prominence.

FIRST HALF-YEAR.

As an efficient aid and drill in the acquisition of a correct pronunciation, frequent general conversational and dictation exercises and the memorizing of idioms and colloquial phrases are employed. The conversational exercises are sometimes conducted by means of conversational "Wall Pictures;" the subjects "Spring" and "Summer" are usually selected for the first term's work on account of the familiarity of the vocabulary suggested by them.

Composition is based largely upon the oral work of the class room; in addition to numerous prescribed exercises, Spain and Mexico, and their resources are made the subjects of prose composition.

The work in grammar for the most part consists of the rudiments, including nouns, pronouns, numerals, the article, adjectives, regular and auxiliary verbs, and the commoner irregular verbs in the present tense, indicative mode.

Text-book: Introducción á la Lengua Castellana, Marion y des Garennes.

SECOND HALF-YEAR.

Drill in conversation is continued, and as one means to this end "Wall Pictures" are employed.

Easy selections of Spanish prose are read and their content is discussed in the form of question and answer in Spanish by teacher and pupils or by pupils with one another.

Composition forms a large part of the work of this term, and is both oral and written. It consists chiefly of the reproduction and paraphrasing of stories read in class. Written exercises upon topics illustrated in "Wall Pictures" or connected with Central American countries are used at times. Letter writing is begun.

Selections for memorizing are assigned.

Thorough drill on the regular verbs and auxiliaries in the indicative mode is the distinctive grammatical work.

Text-books: Introducción á la Lengua Castellana, Marion y des Garennes. Spanish Grammar, Hills and Ford.

THIRD HALF-YEAR.

The reading material is selected stories from modern Spanish prose writers. The conversational exercises are based upon this material and upon the geography, natural resources, etc., of Mexico, Cuba, and Puerto Rico, and also upon conversational "Wall Pictures," and later furnish topics for written exercises, brief compositions, and simple letters.

Selections for memorizing are assigned.

The systematic study of grammar is begun this term.

Text-books: Spanish Grammar, Hills and Ford. Spanish Reader, Carlos Bransby.

FOURTH HALF-YEAR.

A careful study is made of a longer story.

A systematic study of prose composition is begun.

Conversational exercises, compositions, reproductions, and letters form an important part of the work. "Wall Pictures" and the countries of South America furnish additional material for conversation and composition.

Selections are assigned for memorizing.

The systematic study of grammar is continued.

Text-books: Spanish Grammar, Hills and Ford. Zaragueta, Carrión and Aza. Spanish Prose Composition, G. W. Umphrey.

FIFTH HALF-YEAR.

The pupil's acquaintance with ordinary conversational Spanish is extended by the reading of a story introducing Spanish customs and home life. The characteristics of the Spanish people as revealed in this novel are studied and compared with our own traits. In connection with this novel, a short sketch of the author's life and works is studied.

Conversational exercises are based upon the reading matter and upon the political organization, administration, commerce, industry, and culture of the Spanish nation.

The written work reviews in a general way the oral exercises. Character sketches are given and outlines of certain parts of the novel just read. Especial emphasis is placed upon the writing of business and formal letters.

Systematic study of grammar is continued.

Text-books: Spanish Grammar, Hills and Ford. El Capitán Veneno, Alarcón. Spanish Prose Composition, G. W. Umphrey.

SIXTH HALF-YEAR.

As an introduction to the comedy studied this term a short biographical sketch of the author is given. After the comedy has been read, the characters and their motives are discussed, and the development and purpose of the drama are considered.

A novel of great literary value is read, which depicts the manners and life of the sixteenth century, introducing characters from all walks.

Conversational exercises are based upon the reading material. The summing up of a scene or an act or of the whole play, the plot, the characters, the scenes, and the situations, give themes for composition in Spanish.

Letter writing, both business and formal, is continued, together with the systematic study of grammar.

Text-books: Spanish Grammar, Hills and Ford. El Si de las Niñas, Moratín. Gil Blas, Padre Isla. Spanish Prose Composition, G. W. Umphrey.

SEVENTH HALF-YEAR.

A selection from modern Spanish fiction forms the basis of this term's work. This novel is studied carefully, the aim being the full comprehension of the whole work. To this end each chapter is read, discussed, and summed up briefly, and finally the whole problem is resolved.

A short sketch of the author is written in Spanish by the pupils. The characters of the work read are described, and themes suggested by it furnish subjects for written work.

Letter writing is continued, and such review is made of the principles of grammar as seems necessary.

Text-books: Spanish Grammar, Hills and Ford. Marianela, B. Pérez Galdós. Spanish Prose Composition, G. W. Umphrey.

EIGHTH HALF-YEAR.

A masterpiece of 19th century Spanish dramatic literature and the masterpiece of all Spanish literature afford a fitting culmination for the reading of the four years' course and furnish numerous themes for composition in Spanish.

The biography of Miguel de Cervantes is studied and sketches of his life are written.

In conclusion there is given a brief outline of the History of the Spanish language, showing its origin, growth, and relation to other languages.

Text-books: Spanish Grammar, Hills and Ford. El Haz de Leña, Núñez de Arce. Don Quixote, Miguel de Cervantes. Spanish Prose Composition, G. W. Umphrey.

COURSE OF STUDY IN HISTORY.

Time Allotment. The work in History extends through the third and fourth years, five periods per week, except in the scientific course in which it is given in the second and fourth years, and in the commercial course, in which Commercial Geography is studied in the eighth half year instead of History.

Aim. It is the aim of the course to give the students such a knowledge of the development of the race as will enable them better to understand our present stage of progress. Consequently all courses, whether ancient, mediæval, or modern, are studied with relation to modern times. A mastery of the chief facts of history is required, but they are studied as land-marks in great movements and not as isolated facts, to the end that a sense of the unity and continuity of history may be preserved. An effort is made to emphasize the social, economic, and cultural phases as well as the political development, and to show

that the blessings and the evils of the present are the products of the past, that is, that every historical event has grown out of the combination of many others preceding it.

Scope. West's "Ancient World" and "Modern History" are used as the basis of the study. Special stress is placed on the parts deemed most important; more attention is given to English History than it receives in the text; and the course in Modern History is enriched throughout by constant comparisons with the institutions and constitution of the United States. In the last year of the course, features of the history of the United States are directly presented in the topical work.

Topical Work. It is felt that the most lasting benefits of the history work are those resulting from the library study. Each pupil prepares from two to four "topics" each half year based on his own reading in the library from assigned references. Parallel reading in secondary authors and in original sources is frequently required, and reference is made to historical novels and plays. This work varies in method with the teacher, and no two classes have exactly the same assignment. The general plan has four definite features: 1. reading assigned references, 2. preparing a brief talk to be presented, with or without notes, before the class, or an essay to be handed to the teacher and later read before the class, 3. taking notes by all the class on this topic as presented, 4. preparing essays by the class from some of these notes. A few representative topics are here mentioned to give some idea of this side of the work: 1. Rameses as a Builder. 2. Egypt the Cradle of Science. 3. The Mission of the Hebrews. 4. Schlieman's Excavations at Hissarlik (Troy). 5. The Olympian Games. 6. The Influence of Greek Civilization. 7. The Position of Women at Rome before the Punic Wars. 8. Caesar in Britain. 9. The Golden Age of Literature. 10. The Destruction of Pompeii and Herculaneum. 11. Higher Education in the Roman Empire. 12. The Religion of the Teutons. 13. The Origin of Feudalism. 14. Fairs in the Middle Ages. 15. Florence under the Medici. 16. The Partition of Poland. 17. Judicial Reforms in England under Henry

II. 18. Society and Life in Paris in the 18th Century. 19. The Attitude of the United States toward the French Revolution. 20. The Purchase of Louisiana from France by the United States. 21. The Great Reform Bill of 1832. 22. The Conditions of Labor in England in the 19th Century.

The objects of the preparation of topics are : 1. to familiarize the pupils with standard histories, such as the books of Holm, Mommsen, Bryce, and Green ; 2. to give them a taste for historical reading ; 3. to teach them how to use books for reference ; 4. to give them wider information on a few subjects than the text gives and than others in the class have, that is, something really new to present to their classmates ; 5. to train them in taking notes as they read ; 6. to make it necessary for them to sift and analyze material and to present it in a form not only attractive but clear enough for others to take notes upon it, and 7. incidentally to train those who go to college for the definite library work of the college or professional school.

The relation of geography to history is taught by frequent use of wall maps and the blackboard, and by map drawing. Pupils draw from two to six maps each half year for their note-books, or on a larger scale for use in class. In all of this work, considerable time is devoted to the form and appearance of the note-book as a whole. Orderly and business like habits are insisted upon as necessary to the production of a good notebook.

ANCIENT HISTORY.

FIRST HALF-YEAR.

At the beginning of the first half year's work a short survey of the history of Egypt, Chaldea, Babylonia, Assyria, and Persia is made, in which is discussed the development of the science, art, literature, religion, and government of these nations. The geography and early history of Greece are then taken up, the primitive Mycenaean and Achaean periods are studied. The migrations of the Dorians and Greek colonization follow, and then the history of Sparta and Athens is studied intensively. The constitutions of Lycurgus, Solon, and Cleisthenes receive special attention, the development of Democracy from Monarchy through Oligarchy and Tyranny is emphasized. In studying the Persian Wars, the causes, chief events, and results are summarized,

and the character and services of the leading men on both sides are carefully considered. "The Age of Pericles" is, of course, presented as the period in which the political and intellectual life of Greece reached its culmination. The development of art, science, literature, and philosophy is traced. The Peloponnesian War, the rise and fall of the Athenian Empire, the Spartan and Theban Supremacies, and the rise and fall of Macedon are carefully studied, and the term ends with Rome supreme in Greece.

Text-book: West's "Ancient World," pages 1-251.

SECOND HALF-YEAR.

The second half-year deals with Roman History and the period of the Teutonic invasions. The period of the kings is presented as the time when the religious and social foundations of Rome were laid. Then, the bitter struggles of plebeians against patricians for social and political equality are studied, and the meaning of the victories of the plebeians is made plain. During this same period the growth of Rome from a small city-state to the domination of all Italy is traced. The expansion and ambition of Rome and her inevitable clash with Carthage are then considered in the Punic Wars. The course of events in the East is followed, especially the Macedonian wars, by which all Greece and Macedonia came under Roman sway. This restless ambition of Rome is shown to be the cause of expansion both westward and eastward, and to pave the way for the Empire that soon follows. The new distinction between rich and poor, that replaced the old class distinction, is shown to lead to the reforms of the Gracchi and to the unconstitutional steps that injured the people's cause and started the revolution which ended in the military dictatorship and the establishment of the Empire. The characters and deeds of the great men of this last period of the Republic, Marius, Sulla, and especially Caesar, are made to stand out, and the steps by which Octavius Caesar becomes emperor are traced.

During the first 300 years of the Empire, the "Golden Age" of Roman Literature, the great architectural works, the spread of Christianity, and the territorial expansion to the East are the chief topics considered. These subjects are followed by Diocletian's division of the Empire, Constantine's removal of the capital to Constantinople, the inroads of the barbarians, and the decline of the Western Empire. This half-year's work ends with the Mohammedan movement of conquest and the Empire and work of Charlemagne.

Text-book: West's "Ancient World" from page 253 to the end of the book.

MEDIAEVAL AND MODERN HISTORY.

THIRD HALF-YEAR.

The lawlessness following the disruption of Charlemagne's Empire is first considered; then the rise of Feudalism out of the disorder, especially the bearing of feudal society upon conditions preceding the French Revolution. Germany and the Holy Roman Empire are studied, and especially the power of the Church as expressed in her conflict with temporal rulers and the Crusades. The pupil is led to see the widening of world activity through the period of inventions, commercial

activity, and the intellectual revival. The latter part of the course considers the rise of the nation-states of Europe, the Reformation, the Age of Louis XIV, the period of European colonial expansion, and the Age of Frederick the Great. Throughout the course emphasis is placed upon English constitutional and social development and its bearing upon American colonial institutions.

Text-book: West's Modern History," pages 1-302.

FOURTH HALF-YEAR.

The pupil is led to realize the dynamic character of the French Revolution and Napoleonic wars by a thorough study of these subjects as well as the conditions of society in 1789 and their relation to the past, the march of events, the transition from a national to an international struggle, the career of Napoleon, and the resulting political forces which dominated European politics in the nineteenth century. Such important subjects as the system of Metternich and the unification of Italy and Germany are considered chiefly from the standpoint of great personages, Metternich, Cavour, Bismarck, and others. Emphasis is placed upon the Industrial Revolution in England and its political effect. The pupils studies the nature of the present English Government, comparing the cabinet and congressional system of governments. A comparison of the governments of the more important countries of Europe is made, in the light of American Institutions, so far as time will allow. The course takes up the European expansion into Africa and Asia, England's colonial empire—especially Canada, India, and Australia—and the clash of interests in Asia, terminating with the Russo-Japanese War. The course closes with a discussion of the trend of events in the twentieth century.

Text-book: West's "Modern History" from page 302 to the end of the book.

COURSE OF STUDY IN CIVICS.

Time Allotment. The course in Civics is provided for pupils of the Commercial Course and is given five forty-three minute periods each week during the seventh half-year.

Aim. The aim of instruction in Civics is that the pupils may become familiar with their political surroundings and duties, with the political machinery which they will be called upon to manage as citizens of a republic. The historical development of our institutions is emphasized, in order that the pupil may see that his government is a heritage from past ages. The actual operation of the government is given careful attention; and parties,—their machinery, conventions, platforms, and primaries, are studied. Throughout, constant reference is made to parallels or divergencies in foreign politics, showing how governmental forms similar to ours do not necessarily develop similar political institutions.

The work prescribed is planned to enable the high school student more thoroughly to understand Republican institutions, and to influence him to be an energetic crusader in the cause of good government.

Method. No subject in the entire school curriculum is more practical, and no subject is so closely associated with the interests and daily activities of the individual after he enters the ranks of active men and women. The pupils are urged to watch the daily newspapers for items of political interest. A record of these items and of their own observations is kept in a notebook and furnishes concrete illustration of the general descriptions of the text-book. Reports of assigned readings are made before the class upon important topics not considered fully in the text. These reports constitute part of the notebook. Mock-trials, and reports of proceedings of Legislature and of Congress serve to vitalize the work. Debates are held occasionally on pertinent subjects in order to train the members of the class to think logically before an audience and to express their thoughts forcefully. Tabulations are used as effective means of review, and maps, charts, and illustrations prepared by the pupils help to maintain interest. After such a study the pupil feels that our government is more than a formal statement; he sees the spirit and the workings of the institutions described.

Scope. Until recent years the subject of civics as taught in the high school dealt solely with a study of the federal government and the Constitution of the United States. It is recognized in the course here presented that those public affairs which concern all of the people cannot be properly conducted unless the individual is prepared for the duties of citizenship, and is made to understand the system of state and local government under which he lives, and by which his daily conduct is regulated.

The pupil first studies the character of his local government. He builds up a description of the government of St. Louis from a study of her city charter and reports of officials, and

from first-hand observations of elections, sessions of courts, and meetings of the municipal assembly. He is also encouraged to visit charitable, penal, and educational institutions, established and maintained by the commonwealth, in order that he may more thoroughly understand the responsibilities and obligations devolving upon the citizen. He also makes some study of the fundamental ideas of law and justice.

State government is next studied, with special attention paid to that of Missouri, the material being gleaned from local histories, the state constitution, the legislative manual, and official reports. The aim is to have the pupil come into personal contact as far as possible with the various departments of the city and state governments, legislative, executive, and judicial. Especial attention is given to the provisions the city and state make for education, for the care of the poor, the unfortunate, and the criminal.

The latter half of the term is taken up with a study of our national government. The origin, terms, and interpretation of the constitution of the United States in its broad outlines is first considered. The relation of our government to earlier forms is shown, and the various stages follow through which it has passed in its evolution from a few scattered governmental units along the north and south Atlantic seaboard to its present dignity as the world's greatest republic.

Attention is given to the Civil Government of the Colonies and to the Confederation of States. The Representative Assemblies, which so thoroughly schooled the colonists in the principles of republican government and trained them for the work of framing the national constitution, are treated briefly.

The provisions of the United States constitution are studied; but no attempt is made to analyze it clause by clause. Definite and specific information is given as to the essential features of the Federal government, which enables the beginner more thoroughly to understand the state and local government.

The students are required to prepare oral and written topics to be presented before the class, the members of which are

held responsible for the topics given. Supplementary reading is encouraged, and the books used are: Clements, Civil Government; Strong and Schafer, Government of the American People; Morrill's Civil Government of the United States and Illinois; McCleary's Civil Government; James and Sanford, Civil Government; Hart's Actual Government; Forman's Advanced Civics. In connection with the study of the state government, students use the Official Manual (Blue Book) of Missouri, The Revised Statutes of Missouri, and Rader's Civil Government of the United States and Missouri.

Text-book: The American Government, Ashley.

COURSE OF STUDY IN ECONOMICS.

Time Allotment. The course in economics is provided for pupils of the Commercial Course and is given five forty-three minute periods each week during the eighth half year.

Aim and Purpose. No one who thinks deeply upon the public questions of today can help being impressed by the need of general education in economic principles. The prosperity of the country depends to a great extent upon its industries. As its industries grow, the tendency towards specialization of labor and centralization of capital increases, and industrial problems become more complicated. Yet the general public has had little training to prepare it to solve these problems as they arise. The school children are our future public, and it is the aim of this study to present in a simple form to high school pupils the fundamental truths underlying industrial and political problems. Its purpose is not only to show them how men obtain a living, but also to arouse their interest in public questions, to enable them to read discussions of these questions with intelligence and profit, and thus to prepare them to direct and support the best national policies.

Scope. The fundamental economic principles are studied with reference to their historical expression. In connection with means of transportation, such topics as the concentration of population and of industry, the organization of corporations, municipal control of public utilities, monopolies, the process of

distribution, labor organizations, public charities, are discussed. The financial crises of the United States bring up such questions as laws of crises, banks and their functions, the functions of money, the laws of its circulation, bimetallism, paper money.

Note books are kept in which are recorded original investigations, reports of assigned topics, outlines, records of visits to business and manufacturing establishments, banks, and exchanges.

TOPICS STUDIED.

Historical view. The nature of the study of economics; the economic life of uncivilized, semicivilized, and civilized man; the economic history of England, with particular reference to agriculture, manufactures, transportation, and economic legislation; the economic history of the United States and the tendencies to reaction against the passive policy of the United States Government.

Production. The nature and requisites of production; the law of production from the soil, a law of diminishing returns in proportion to the increased application of labor and capital; the effect of improvements in railways and manufactures on the law of diminishing returns; the effect of the combination and division of labor upon production.

Labor. Productive and unproductive labor distinguished; the advantages and disadvantages of the division of labor; the distinction between labor for the supply of productive consumption and labor for the supply of unproductive consumption.

Capital. Distinction between capital and wealth; the law of the increase of capital; consumption and growth of capital; capital necessary to labor.

Exchange. The development of exchange; value in use, exchange value, and price distinguished.

Money. The functions of money; the popular, legal, and economic conceptions of money; the use of gold and silver as money and the management of subsidiary coins; variation in the value of money; coinage; paper money; the effect of the increase in the issue of paper money; the silver question and bimetallism; silver legislation in the United States; wealth, capital, and money distinguished; the nature and importance of a proper standard of value and system of currency.

Credit. Credit as a substitute for money; advantages and evils of credit; forms of credit; influence of credit on prices.

Distribution. The distribution of the product among the different factors of production.

Rent. The effect of a natural monopoly; rent based on the law of diminishing returns; the effect of rent upon the cost of production.

Wages. The effect of competition and custom upon wages; popular opinions respecting wages; remedies for low wages; differences of wages in different employments.

The Labor Movement. Labor organizations and their aims; opposition to labor unions; strikes; success and failure of strikes; labor legislation. Profit-Sharing and Co-operation. Form and advantages of co-operation; influence on the character of workmen.

Interest and Profits. Replacement, insurance, interest, wages of superintendence, pure profit; circumstances which determine the fluctuation of interest; the effect of interest on the price of land and securities.

Banks, Savings Banks.

Consumption. Classification and analysis of consumption.

Public and Private Property. The historic cause, justification, and influence of private property on individual wealth. Socialism, its rise and principles.

Guaranteed Privileges. Trade marks, copyrights, and patents. Bounties, Subsidies, Franchises.

Free Trade and Protection.

Corporations, Monopolies, Trusts.

Taxation. Reasons for taxes; direct and indirect taxes; income tax; tax on personal property; revenues of the United States.

International Trade.

Text-book. Ely, Outlines of Economics.

COURSE OF STUDY IN BIOLOGY.

Importance of Biology. The investigations of science have shed so much light upon the Biological field, that the phenomena of life, whether vegetable or animal, have acquired the greatest hygienic and economic interest. All forms of life are so intimately connected with human welfare that nothing living fails of the most painstaking and exhaustive study by the scientist, and every one should be sufficiently acquainted with the main lines of scientific knowledge and research to take an intelligent and lively interest in the results of scientific efforts in this field. Health and life are bound up with a knowledge of biology, and an intelligent application of the truths discovered and formulated by science. Man's needs and environment are such that he cannot with comfort or safety ignore the life, visible and invisible, that surrounds him and conditions his own existence and welfare. The conservation of natural resources of forest and field and stream is one of the great problems of nations, and is engaging the best scientific thought; agriculture is fast becoming an applied science; bacteriology and entomology are great fields of investigation.

Appropriate to High School Age. The world of vegetation and of animal life can not be regarded as a thing apart from human interest of the most intimate and vital sort. The age of High School pupils suggests the introduction of

scientific observation of ordinary phenomena of every sort. It is the consensus of pedagogical opinion that scientific study should engage much of the attention of the pupils at this age. Not that the deep mysteries of science can be investigated or their solution attempted at this time, but that truly scientific methods of investigation may be followed in the study that is made of elementary principles. It is for the youth of High School age to learn the more obvious facts of the structure and function of the essential organs of life, to form correct, clearly defined conceptions of life processes as illustrated in typical plants and animals, and in man, to become acquainted with the latest results of scientific study of nutrition, ventilation, sanitation, infection, and sepsis.

Needed by City Youth. Especially should the city youth study biology, as they are cut off from direct contact with both vegetable and animal life in its natural habitat, and must grow up in ignorance of it unless opportunity for its study is provided by the school. The country boy is ever in close touch with the various forms of life, and is possessed of its secrets, but the city boy must be inducted into its mysteries by one who knows them. Intelligent sympathy with nature and nature's laws resulting from their close study and careful observance is a fruitful source of health and happiness, of material advance and spiritual growth; it discloses profitable activities and suggests needed inhibitions and wholesome restraint.

Purpose of Biological Study. It is the ultimate purpose of the study of Botany and Physiology to make the pupil appreciative of the biological field of investigation, receptive to biological truth, responsive to the discoveries of science in regard to plant and animal life, able and disposed to order his individual and communal life in conformity to the teachings of science, keenly sensitive to the beauties of color and form in plant and animal, and quick to note the marvelous adaptations of organ to function and of species to environment. Its immediate aim is acquaintance with important elemental facts of the structure and function of the essential organs of life; com-

prehension of the processes of life—germination, growth, respiration, circulation, reproduction; knowledge of typical forms of life that may be extended at will.

COURSE OF STUDY IN BOTANY.

Time Allotment. All pupils entering the High School take Botany for the first half-year, a period of twenty weeks.

Aim. It is the aim of the course in Botany to acquaint the pupil with the simpler laws of the organic world, to give him at least a glimpse of the great human interest in biological study, to train him to observe accurately and to think logically, and to develop in him an intelligent love of nature that will be a source of pleasure and profit to him and to the community in his later life.

In organizing a brief elementary course, such as the age of the pupils and the time given to the work demand, the development of the pupil rather than the science must take precedence. Morphology, physiology, ecology, and taxonomy are not made separate subjects of instruction, but the science is treated as a unit; specialization is left for more advanced courses.

Plan of Organization. The distinctive claim of biology to consideration is that it alone of all the subjects of the course deals with life. Therefore, in its study, the life of the plant is made the central thought and gives continuity to the teaching. Since the organs exist to carry on life processes, their structure can be understood only in the light of their functions, and they are, therefore, studied in close connection with the work which they perform.

Method. The time of the classes is divided about equally between the class-room and the laboratory. Laboratory work is carried on in the class-room also whenever it is thought desirable. The regular class-room work consists of recitations from the text-book, demonstrations by means of objects and experiments and stereopticon, and discussion of notes. Living plants as a whole and their parts, roots, stems, leaves, flowers, and seeds, are handled in the laboratory by individual pupils. Notes and drawings are required in connection with all laboratory work and much class-room work.

The laboratory work and that of the class-room are carefully correlated; each is but the continuation of the other. It is considered essential that there be no break in the continuity of the work, such as would be occasioned if the laboratory work were organized independently of the recitations.

The essential life processes, such as photosynthesis, respiration, transpiration, absorption of water, root pressure, and ascent of sap, are shown by experiments. A number of these experiments are performed by the individual pupils either at home or in the class-room; others requiring more elaborate apparatus or more skillful manipulation are performed by the teacher in the presence of the pupils; but in either case, the pupils see and examine the results and make the experiments their own by means of original notes and drawings and the inferences they derive.

The influence of environment on plant life is shown by laboratory exercises and stereopticon views illustrating the effect of moisture and dryness, sunlight and shade, heat and cold, rain and drouth, wind and soil, and the activities of animals and man. The stereopticon illustrates also the various plant societies resulting from environmental influences and the unique adaptations of xerophytes, hydrophytes, and insectivorous plants.

Equipment. The lanterns with which the laboratories are supplied are of the most advanced type, equipped for both lantern and microscope slides. These lanterns are of great service in illustrating minute plant structure and various phases of vegetable life.

Compound microscopes are supplied for demonstration purposes, and for more detailed study of microscopic structure.

The laboratories are equipped with greenhouses in which living material for the physiological experiments may be secured and the pupils' experiments conducted. The Missouri Botanical Garden has been most generous in keeping the conservatories stocked from season to season.

Fresh material from the field, including leaves, twigs, buds, roots, rhizomes, flowers, fruits, and seeds, collected by an

experienced botanist, is supplied to each laboratory daily or as required. Field trips for the pupils are occasionally arranged, and visits to Shaw's Gardens are encouraged.

The department libraries contain Kerner and Oliver's Natural History of Plants, Britton and Brown's Illustrated Flora, and other works of reference.

Outline of Course. The following schedule of topics outlines the course in essential features. Individual preferences of teachers and varying conditions of season and classes cause modifications.

1. Study of Fruits; structure of seeds.
 2. Seedlings in their relations to air, light, water, and heat.
 3. Nutrition; chlorophyll, photosynthesis, leaf structure, carbon dioxide, oxygen, hydrogen, digestion, transportation of food, assimilation, storage.
 4. Function, structure, and life relations of stems, roots, twigs, buds, tendrils, and leaves.
 5. Response to stimuli, heliotropism, geotropism, hydrotropism.
 6. Growth and energy—Cell structure, growth, and division; respiration.
 7. Struggle for existence—adaptation, seed dispersal, plant societies.
 8. Variation.
 9. The plant groups, I, II, III, IV. Development of the process of reproduction.
 10. Flowers—few types studied rather thoroughly in season.
- Text-book:* Plant Studies, Coulter.

COURSE OF STUDY IN PHYSIOLOGY.

Time Allotment. Physiology is studied by all pupils the second half-year five periods a week.

Aim. The aim of the course in physiology is to present in a scientific manner the facts of human anatomy and physiology. The greater part of the time is spent in developing physiological and anatomical ideas, but it is borne in mind that these ideas ultimately find expression in the rules of hygiene, since these rules are not arbitrary statements, but the logical outgrowth of the facts and principles of Physiology.

Method. Emphasis is placed on the study of actual specimens and on demonstrations. In order to form a suitable basis for understanding the structures of the body, dissections are

introduced. In some cases, the students are expected to make such dissections; in others, they only examine and make drawings of those that are prepared for them.

A note-book record including drawings is made by the pupil. The following topics are considered but not necessarily in the order stated.

OUTLINE OF COURSE.

Foods. Physiology will be better understood if some of the principles of Physics and Chemistry are considered. These are taken up experimentally in connection with such topics as: the sources of food, foods as tissue builders, the nutritive value of foods, the preparation of foods, the amount of food needed. Acids, alkalies, osmosis, starch, sugars, proteids, fats, water, flour, milk, are subjects of experiments. Problems in daily dietaries are worked out, the value of a mixed diet and the effect of starvation are discussed.

Digestion. The work on digestion is commenced by a study of the general arrangement of the digestive system, and of its structure and function. This is followed by a more careful and detailed study of each individual part, such as: the mouth with the teeth, glands, and saliva; the stomach, its structure, action, reaction, and juices; the intestines, pancreas, and liver. Experiments are performed to illustrate the enzymic action of the various digestive fluids. Conclusions from this experimental work are applied to the formulation of rules of hygienic eating and for the prevention of dyspepsia and constipation. A brief comparative study of the digestive systems of various animals is sometimes attempted.

Absorption and Nutrition. The processes of absorption naturally follow those of digestion. The structure of the villi, the places of absorption, and the routes of the absorbed foods are carefully considered. The uses of this absorbed material are brought out by a study of metabolism and nutrition.

Blood and Circulation. The composition of the blood is studied, and the nature of plasma, lymph, corpuscles, coagulation, serum, and fibrin is brought out. The heart is dissected, and its structure and action are worked out in detail. Arteries, veins, and capillaries are compared. The flow of blood in a frog's foot is demonstrated by use of the microscope. Pupils are required to make a diagram of the entire circulation. Such hygienic considerations as the effect of temperature, the use of exercise, the treatment of cuts and bruises, are also made prominent.

Skeleton. After a general consideration of the skeleton, bones of the human body are studied and drawn. Their use and adaptation to their special work is noted. The gross and microscopic structure of long and flat bones is shown by experiments and by means of the microscope. Demonstrations of the kinds of joints are made, and the nature of fractures, dislocations, and sprains is explained.

Muscles. Drawings of striated, non-striated, and branched muscle fibres are made. The location and action of the principal muscles are studied. Nerve control and the laws of muscle action are carefully

considered. Experiments are performed with the muscle apparatus, and problems in lever action are worked. The necessity of food, fresh air, exercise, and rest to make muscles healthy is emphasized.

Respiration. The work on respiration is based on a study of the respiratory organs of higher vertebrates, and experiments with air, oxygen, and carbon-dioxide. Breathing movements, changes in inspired and expired air, the effect of impure air, the effect of exercise, the effects of tight clothing and artificial respiration are some of the topics considered.

Ventilation. A study is made of air currents produced by hot and cold objects, and doors and windows are tested in order to bring out the principles of ventilation. Problems are solved that deal with the amount of fresh air needed by an individual.

Excretion. The structure of the excretory system is noted. Such parts as the hairs, nails, glands, and papillae are considered in detail. The gross and microscopic structure of the kidneys is taken up carefully. Attention is given to cleanliness, and to the treatment of scalds and burns. A number of experiments dealing with evaporation are performed. Common rules for the prevention of colds are also demonstrated.

Nervous System. A very careful and complete study is made of the Nervous Systems. The structure of the brain, spinal cord, cranial and spinal nerves is studied in detail. The several sense centers and areas are located. Experiments are performed to illustrate reflex action. The interdependence of the systems is explained, and the necessity of food, fresh air, rest, and exercise to the proper action of the nervous system, is emphasized.

Senses. The General Senses of pressure, weight, temperature, hunger, and pain are defined and demonstrated.

Each of the Special Senses of seeing, hearing, touching, smelling, tasting, and the voice are considered.

The structure and use of the eye. The meaning of accommodation. The defects of the eye and their remedies. Color sensations. The hygiene and proper care of the eye.

The structure and function of the ear. The production of sound and its effect. The equilibrium sense. The proper care of the ear.

The delicacy of touch and its relation to temperature and muscular sensations.

The relation of taste and smell. The exact structure of the tongue. The nerves of taste.

The structure of the nose and the reasons why one should breathe through it.

The structure of the larynx. Voice and speech compared. Pitch, quality, and reinforcement.

Bacteria. Their growth, culture, and isolation. Their connection with health and disease. Asepsis and antisepsis.

Text-book: Physiology, Briefer Course, Colton.

COURSE OF STUDY IN PHYSICS.

Time Allotment. Three terms of Physics, five periods per week, are offered in the third, fourth, and fifth half-years. Two terms are required of all pupils. The third term is re-

quired in the Scientific and College Scientific Courses, and is elective in the General, Art, and Manual Training Courses. Pupils of the Classical Course take Physics in the seventh and eighth half-years only.

Purpose. The purpose of Physics is: to stimulate interest of the pupil in natural physical phenomena; to give a more intelligent understanding of physical environment; to promote careful and systematic observation, and to train to draw logical conclusions from the observed facts gathered from experiment; to teach correct interpretation of both oral and written instructions; to enable the pupil to interpret correctly the results of experimental work and to apply mathematical formulae to physical results; to secure clear and concise expression in good English; to give facility in the manipulation of apparatus; to form habits of systematic arrangement in the handling of details; to foster and encourage initiative in the solution of problems and in the mastering of new conditions.

Methods. Recitations and Laboratory Work are carried on at the same time, and equal importance is attached to each. At least one double period per week is given to Laboratory work. Each branch of the work must be done satisfactorily in order to complete the subject. The recitation or class-room work consists 1. of demonstration by the instructor, and 2. of recitations by the pupils on assigned portions of the text and on demonstrations by the teacher. The solution of problems based on the work of the class-room forms an important part of the work. A close correlation is maintained between the class-room work and the experimental work done in the Laboratory.

In the Laboratory the pupil is given an opportunity to verify many of the facts learned in the class-room and to supplement the work of the text-book. The Laboratories of the various High Schools are equipped with sufficient apparatus for all the pupils of a class to perform the same experiment at the same time. Here the pupil is thrown largely upon his own resources. While definite instructions are given for the performance of each experiment and the recording of results, and the teacher

gives general direction to the work; yet, as far as possible, the pupil is left to help himself. Each experiment is accompanied by a series of questions intended to assist the pupil to a clear understanding of its full import. Rough notes are taken in the Laboratory at the time the experiment is performed. From these notes the completed report is written up later and, together with original data, is submitted to the teacher for his inspection and approval.

Division of Work. The two terms of Physics (I., II.), required of all pupils, are devoted particularly to the general and informational side of the subject. All the general divisions of the subject are studied during these two terms. The more difficult and distinctly mathematical portions of the subject are reserved for the third term (III.).

Outline of Work. The work of the first term (I.) takes up the study of the following topics:

FIRST HALF-YEAR.

- I. *Properties of Matter:* General, special.
- II *Dynamics of Fluids:* Nature and properties of liquids and gases; laws governing their action; applications in barometer, hydraulic press, air and water pumps, siphon, buoyancy, density.
- III. *Dynamics of Solids:* Motion, force, work, energy, and their measurements; illustrated by falling bodies, rotating bodies, pendulum, lever, and inclined plane, with modifications.
- IV. *Sound:* Sources, transmission, intensity, pitch, quality.

During the first term about 18 experiments (selected from the following list) are performed in the Laboratory:

PROPERTIES OF MATTER.

1. Extension,—Measurement of Length, Area, and Volume.
2. Unit of Mass,—Measurement of volume and weight of water and mercury.
3. Use of the vernier caliper,—Density of a Cylinder.
4. Indestructibility and Impenetrability. 5. Tenacity of wire.

MECHANICS OF FLUIDS.

6. Pressure due to depth,—use of squared paper. 7. Principle of Archimedes.
8. Density of Solids. 9. Density of Liquids. 10. The Barometer.
11. The Siphon. 12. Suction and Force Pump.

MECHANICS OF SOLIDS.

13. Elasticity of Stretching. 14. Composition of Concurrent Forces. 15. Reflected Motion. 16. Center of Gravity. 17. The Laws of the Pendulum.
18. Moments and the Lever. 19. The Law of Machines, the Pulley and the Wheel and Axle.
20. The Inclined Plane.

SOUND.

21. Study of Vibrations. 22. Sources and Transmission of Sound.
23. Loudness of sound,—determining factors.
24. Velocity of sound,—determined by the use of the Tuning Fork.
25. Vibration of Strings,—Laws of Lengths and Tensions.

SECOND HALF-YEAR.

The work of the second term (II.) takes up the study of the following topics:

I. *Heat*: Nature and sources, transference, effects, transformation, uses.

II. *Light*: Nature and sources, transmission, reflection, refraction, mirrors and lenses, color.

III. *Magnetism and Electricity*:

1. *Magnetism*: Polarity, induction, magnetic field, earth magnetism, theory of magnetism.

2. *Electricity*: Static electricity, chemical and magnetic sources of electric currents, the effects of currents, electrical quantities and their measurement, electrical appliances.

During the second term about 18 experiments (selected from the following list) are performed in the Laboratory:

HEAT.

1. Fixed points of a Thermometer.
2. Heat Distribution.
3. Rate of heating and cooling. 4. Boiling under different conditions.
5. Sensible and Latent Heat.
6. Heat changes involved in evaporation, in solution, and in freezing mixtures.

LIGHT.

7. Rectilinear Propagation,—Images formed by small apertures, Law of Inverse Squares, Photometry, Candle Power.
8. Law of Reflection. 9. Images formed by a Plane Mirror.
10. Cylindrical Mirrors.
11. Images formed by a Spherical Mirror.
12. Refraction. 13. Law of Refraction,—Index of Refraction for Air-Glass.
14. Images formed by converging lenses.
15. Magnifying Power of Lenses.

MAGNETISM AND ELECTRICITY.

16. General Magnetic Properties. 17. The Magnetic Field.
18. Static Electrical Effects.
19. The Simple Voltaic Cell,—magnetic properties of its current.
20. Study of the Two Fluid Cell. The Dry Cell and Polarization.
21. Chemical Effect of the Current,—Electrolysis of Copper Sulphate, The Storage Cell.
22. The Magnetic Effect of the Current.
23. Heating Effects of the Current. 24. Ohm's Law. 25. Current Induction.
26. Study of the Electric Lamp.
27. The Electric Motor. 28. The Telegraph.

THIRD HALF-YEAR.

V. In the third term (III.) the various subjects are further developed, with special emphasis on the mathematical and quantitative sides.

The work of this term is designed for those who intend to take scientific courses in college, and also for those who have found the subject of special interest. Here text-book and laboratory work are carried on simultaneously, as in the work of the first year, and bear the same relation to each other.

The work of the third term takes up in particular the following topics.

I. *Dynamics of Fluids.*

II. *Dynamics of Solids:* Accelerated motion; falling bodies; composition and resolution of forces, absolute units of force, work, and energy; laws of gravitation; centrifugal force; pendulum; machines.

III. *Sound:* Laws of intensity, resonance and its laws, velocity, interference (beats), musical scale, overtones, harmony, discord.

IV. *Heat:* Effects of heat (Law of Charles), calorimetry, relation of heat and work.

V. *Light:* Shadow formation, photometry, laws of image formation, refraction, prisms, critical angle and total internal reflection, lenses—conjugate foci, rainbow, spectrum analysis, interference, optical instruments.

VI. *Electricity:* Static electricity, potential and conditions of electric flow, laws of resistance, Ohm's Law, fall of potential, Wheatstone bridge, induction—self induction, electrical instruments, Roentgen rays, wireless telegraph.

During the third term about 18 experiments (selected from the following list) are performed in the Laboratory:

Mechanics of Fluids: 1. Boyle's Law. 2. Weight of Air.

Mechanics of Solids: 3. Accelerated Motion. 4. Laws of the Pendulum,—Value of "g".

Sound: 5. Kundt's Experiment. 6. Resonance in long tubes. 7. The Musical Scale.

Heat: 8. Coefficient of Expansion of iron or brass.

9. Coefficient of Expansion of mercury.

10. Coefficient of Expansion of air.

11. Temperature of mixtures.

12. Specific Heat.

13. Latent Heat of Fusion.

14. Latent Heat of Vaporization.

Light: 15. Conjugate Foci of Lenses. 16. Index of Refraction of Air-Water.

17. Study of a Prism.

Electricity: 18. Fall of Potential. 19. The Wheatstone Bridge.

20. Calibration of a Galvanometer. 21. Resistance by Substitution.

22. Determination of Resistances in Series and in Parallel.

Text-book: Elements of Physics, Carhart and Chute.

COURSE OF STUDY IN CHEMISTRY.

Purpose. The purpose of the study of Chemistry in the High Schools is: to acquaint the pupil with the elements that compose the material world and with their compounds of more frequent occurrence; to give a comprehension of the laws and principles that regulate the reaction of substances upon one another; to train to observe independently and accurately, to reason logically from things seen to underlying laws and determining causes, to deduce generalizations from individual phenomena by discrimination of essential resemblances and differences and by discovery of controlling principles of action, to recognize the supremacy of reason and law in nature, and to realize that modern scientific progress has been made by the discovery and strict observance of natural laws. It is to open up the field of chemical activity, which is so closely connected with daily life, with domestic science and medicine, with sanitation and hygiene, and with the arts and manufactures that distinguish modern civilization, and also to give some actual experience and practical skill in applying experimentally the principles learned.

Method. The spirit of the course is experimental. About one-half of the entire time is spent in the laboratory. The equipment and accommodations for the work are exceptionally complete and ample. The exercises of the laboratory are taken up without previous special preparation. Full directions for the manipulation of the experiments, with questions serving to guide the observations into the proper channels, are placed in the hands of the pupils. The notes on this work are discussed and corrected in the class room in a subsequent period. An entire set of corrected notes in neat form is required of each pupil. Demonstrations are given by the instructor to amplify the work of the pupil. The subject matter so introduced is then developed through informal talks and recitations. As guides to the pupil in preparation for recitation work definite assignments of text are made. Trips to various factories and the

use of the stereopticon and charts emphasize the industrial applications of the work.

Scope. Chemistry may be studied two or three half-years according to the course taken. In the college scientific and the scientific courses it is taken during the sixth, seventh, and eighth half-years. In the commercial and preparatory courses it is taken the fifth and sixth half-years. In the art and general courses it may be taken the fifth and sixth half-years, or the sixth, seventh, and eighth half-years. In the manual training courses it may be taken the sixth, seventh, and eighth half-years. The first year of the course has been planned as a unit: it comprises a study of fundamental laws, drill in the use of chemical symbols, nomenclature, formulae, and equations, and practice in laboratory manipulation. The general properties of acids, bases, and salts, and the products of their interaction are carefully considered. It comprises also a study of the common non-metallic elements, their occurrence, preparation, properties, and compounds; namely, hydrogen, oxygen, nitrogen, chlorine, fluorine, bromine, iodine, carbon, silicon, boron, sulphur, and of the metallic elements, their wet and dry test reactions, their occurrence, properties, metallurgy, and compounds.

The third half year consists of a further study of the metallic elements and of theories and fundamental laws, for which preparation has been made by the work of the preceding year. The laboratory work is of a more difficult character, including some of a quantitative nature and the separation and identification of metallic ions.

Text-book: "Elements of Chemistry," Bradbury.

COURSE OF STUDY IN PHYSIOGRAPHY.

Purpose. The work in Physiography is designed to give an intelligent conception of the earth and of the processes which have brought about its present condition; to familiarize the pupils with local illustrations of general physiographic principles; to train to keener observation of phenomena and to logical

reasoning from phenomena to causes and results; to instill such a love of nature as will impel to further study of all earth processes and their influence upon human development.

Scope. As the subject is taught only during the fourth year and only to such pupils as expect to continue their studies in the Teachers College, the scope of the work must be broad and the treatment non-technical. It is preceded by the study of botany, physiology, physics, and chemistry, and, therefore, is somewhat advanced in nature. The first half of the year is devoted to the study of astronomy, geology, and meteorology; the second, to physiographical processes, comparative continental study, and the geographical relations of plants, animals, and man.

Method. The treatment includes recitations, laboratory work, field trips, lectures, and demonstrations. Laboratory methods are used in studying the astronomical relations of the earth, atmospheric phenomena and records, rocks and minerals, and various typical land forms. Each of the pupils keeps a continuous record of the weather and atmospheric conditions for several weeks and makes a daily study of the weather maps for at least part of this period. A visit to the local office of the United States Weather Bureau assists the pupil in acquiring a clear understanding of these things. The maps of the Mississippi River Commission, of the United States Coast Survey, and of the United States Topographic Survey, and lantern slides, are made the basis of the study of such important land forms as cannot be seen in the field, and supplement local studies to great advantage. The characteristics of mountains and plateaus, the development of rivers, and the history of coast lines are in this way brought within the comprehension of pupils so far as is possible without visits to remote regions. The Government maps of the vicinity of Saint Louis are peculiarly useful both as a basis of map work in the laboratory and as an assistance in field study. Many subjects which cannot be treated by the laboratory method are demonstrated by the use of maps, models, stereopticon views, and other apparatus.

Advantage is taken of the local topography to study the effect of erosion in the field. This work is a required part of the course, and a report of each trip is entered in the notebook along with a record of laboratory work. By this means it is hoped to establish a connection between the ideas acquired from the text-book and those which arise from actual contact with nature, and to open the eyes of pupils to the important geographical changes which are taking place around them.

Equipment. The equipment of each school includes a stereopticon of the very best model, an assortment of well selected slides, flat and relief maps of the continents, a relief globe, United States Topographic and Mississippi River Commission maps, Coast Survey Charts, a number of relief models, thermometers, barometers, a rain-gauge, and various other pieces of apparatus. Moreover, the laboratories of the other sciences are drawn upon for needed apparatus in illustrating the application of various natural laws to Physiography, and the collections of the Educational Museum are also used.

Text-book: New Physical Geography, Tarr.

COURSE OF STUDY IN MATHEMATICS.

Time Allotment. The mathematics offered in the High Schools comprises three half-years of Algebra, three of Geometry, two of Trigonometry, and two of Algebra and Geometry in preparation for college. Two half-years of Algebra and two of Geometry are required of all students for graduation. The work of the other half-years mentioned is optional, the choice depending upon the course of study pursued and the wish of the student.

Aims. The student of Mathematics must acquire a certain minimum amount of knowledge of the processes of Mathematics as a fundamental working basis. This knowledge is necessary for a continuance of the study of mathematics; it is necessary in the allied sciences; it is necessary also as a preparation for college entrance. These processes and principles are presented and explained to the student, and are assigned to him

for study; concerning them he recites and is examined, and his apparent success or failure depends upon his knowledge of them.

Purpose. The study of Mathematics aims, however, to do much more. It furnishes exact assumptions from which unquestionable conclusions can be reached by strictly logical processes. With such exact reasoning, surrounding conditions do not change as they do in the problems of life; but by varying the conditions and tracing the corresponding changes in the conclusions, it is believed that the student can be led gradually to apply logical argument and thought to the non-mathematical problems which come to him.

Along with correct habits of thought and reasoning power the student acquires habits of clearness, definiteness, and accuracy in written and oral expression. The theorems of Geometry, for example, are presented to him in clear-cut, pointed, precise statements. He soon becomes so familiar with them that he can repeat them, word for word. Their proofs, always standing in the background of his mind, continually furnish him with forms after which he can model his own reasoning and thus continually direct that reasoning to definite ends. In these processes he must be able to understand exactly the meaning of another's words, and must be able to phrase as accurately his own thought.

The knowledge of mathematics is useful also in every-day life. It is true that many of the formulas necessary for computing lengths, areas, and volumes have been used in the solving of arithmetical problems, and perhaps the student has become proficient in their use; but he cannot, with his knowledge of arithmetic, understand the reasons for the formulas, nor can he share the "fine feeling" which comes with an understanding of their derivation. After they have been derived once, if need be, they can be derived again. Their user thus becomes their master not their servant, and the solution of problems by means of them is deprived of many of its uncertainties.

Method of Presentation. The power of thought together with the mastery of the subject-matter of Mathematics, is at best a gradual development, starting with the student's fund of previously acquired knowledge. As far as possible this development is made continuous. The sequence is such that the distinction between that which is known and that which is to be acquired may be clearly discerned and their relation consciously established. In order that the more difficult parts of the work may fit into and become a part of the consciousness of the pupil, the new material is carefully graded from the concrete, abounding in illustration, to the abstract. For example, in Algebra and Geometry appeal is made to problems of the every-day life of the pupil, to his knowledge of money, rates, distances, time, and so on; in Trigonometry, the student actually measures angles, distances, inaccessible heights, and the like, thus combining physical with mental activity.

Scope. Throughout the course those essential principles which bear on subsequent work are selected and emphasized. Although mastery of the processes explained and accuracy in details are demanded, no attempt is made to pursue exhaustively all topics when they are first presented. The simpler phases of more advanced topics are easier than the difficult phases of the elementary topics; they are more interesting; more work can be done with them; and many students who would not take the advanced work at all are thereby enabled to get at least an elementary knowledge of it.

ELEMENTARY ALGEBRA.

Method. The first course in Algebra gives a general survey of the field ordinarily covered in this subject in secondary schools. In view of the immaturity of the pupils of this grade, great care is taken to show the connection between Arithmetic and Algebra, to make the work as concrete as possible, and to deal in no topic with problems beyond the ability of pupils of fair intelligence. In the solution of the various forms of the equation all the processes of Algebra function. This relation properly presented at suitable moments, affords the pupil

effectual motives for the mastery of the processes. Seeing their use in the teacher's hands, he is stimulated to make himself proficient in them.

FIRST HALF-YEAR.

Addition; subtraction; multiplication; division; factoring in cases of the type forms,—

$ab + ac$, $a^2 \pm 2ab + b^2$, $a^2 \pm b^2$, $a^2 + (b + c)a + bc$, $a^3 \pm b^3$, $ab^2 + bc + d$; fractions, omitting difficult examples in the complex form; simple equations in one unknown number involving only integral numbers; simple fractional equations in one unknown number involving only numerical denominators; quadratic equations in one unknown number capable of solution by the factoring method; and easy problems illustrating each kind of equation studied.

SECOND HALF-YEAR.

More difficult cases of fractional equations of the first degree in one unknown number; equations of the first degree involving two or more unknown numbers; simultaneous equations of the form $\frac{a}{x} + \frac{b}{y} = c$; involution and evolution; quadratic equations in one or more unknown numbers; problems illustrating each kind of equation studied.

GEOMETRY.

Method. The propositions that have most bearing on the particular aspect of the subject immediately under consideration and will be needed most for subsequent study of mathematics and in actual practice are stressed sufficiently to make their relative importance evident. Original theorems and problems (carefully selected and graded) help to place the emphasis where it belongs. Special attention is given to the methods of attack and proof in order that the pupil may learn to be logical and self-reliant. Construction work may be profitably introduced as a way of approach to particular topics at various stages of the study of geometry, in order to furnish necessary concepts and give an idea of the method of procedure in the formal demonstration of theorems and the solution of problems.

THIRD HALF-YEAR.

General properties of plane rectilinear figures and the circle; measurement of angles.

FOURTH HALF-YEAR.

Proportion; similar polygons; regular polygons; areas of polygons; measurement of the circle.

FIFTH HALF-YEAR.

Lines and planes in space; dihedral and polyhedral angles; prisms; parallelopipeds; pyramids; cylinders; cones; the sphere.

INTERMEDIATE ALGEBRA.

Scope. The second course in Algebra consists of both review and advance work. In covering again the work of the first course, special attention is given to the theoretical aspects of the subject. Topics and phases of topics too difficult for the elementary course are now taken up.

SIXTH HALF-YEAR.

Review and further study of fundamental processes, factoring, fractions, powers and roots, simple and quadratic equations; ratio and proportion; doctrine of exponents; imaginaries; binominal theorem; logarithms; progressions.

TRIGONOMETRY.

Scope. The course in Trigonometry includes the work with plane triangles and the right spherical triangle.

SEVENTH HALF-YEAR.

Definitions of functions of angles; solution of the right triangle with applications; formulas of goniometry; trigonometric identities and equations.

EIGHTH HALF-YEAR.

Solution of the oblique triangle with applications; field work with surveying instruments; solution of the right spherical triangle with applications.

ALGEBRA AND GEOMETRY FOR COLLEGE PREPARATION.

Scope. The aim of this course is, as the name implies, the satisfaction of the strictest entrance requirements of any college, university, or technical school. The preparation of students to attend any particular institution determines the special topics studied and the emphasis placed upon them. This work is given in the seventh and eighth half-years in the courses leading to college.

COMMERCIAL BRANCHES.

Purpose. The Commercial Course has the advantage of the general requirements common to all the other courses and specific training through the study of the distinctive commercial

branches. The ultimate purpose of the course is the purpose common to all high school training, discipline and culture along general lines and preparation for citizenship, to which is added the specific purpose of preparing the student for actual business life. The course bears the stamp of its immediate aim at every point, and at the same time loses none of the essentials of a general education.

Scope. The peculiarly commercial studies include: Penmanship, Commercial Arithmetic, Bookkeeping, Commercial Law, Commercial Geography, Stenography, Typewriting.

PENMANSHIP.

Aim. The aim of the instruction in Penmanship is to enable the pupil to acquire a plain business handwriting, combining ease, legibility, and speed.

Time Allotment. The work in Penmanship is given throughout the first year of the commercial course, alternating with Commercial Arithmetic, both subjects together requiring five periods a week.

FIRST HALF-YEAR.

The work of this term embraces: Correct Position, Movement Exercises, Application of Movement to formation of letters and figures, and Practice on words and sentences.

SECOND HALF-YEAR.

The work of this term embraces: Review of Principles, Perfection of Forms, Sentence and Page Writing, Business Forms.

COMMERCIAL ARITHMETIC.

Aim. The study of Commercial Arithmetic aims to give the pupil a practical working knowledge of business computations and to cultivate accuracy, rapidity, and independent thought in the solution of practical business problems. The underlying principles are briefly reviewed, and many practical counting-room methods are introduced. Special attention is given to mental work through oral drills.

Time Allotment. The work in Arithmetic extends through the first year, alternating with penmanship, and averaging two and one-half periods a week.

FIRST HALF-YEAR.

The subjects considered this term are: The Fundamental Processes—Addition, Subtraction, Multiplication, Division. Bills and Accounts, Fractions, Denominate Numbers. Rapid drill work and application of short methods extend throughout the term.

SECOND HALF-YEAR.

The subjects included in this term's work are: Percentage and its applications, emphasizing; Commercial Discounts, Gain and Loss, Commission, Interest, Negotiable Paper, Bank Discount, Stocks and Bonds, Insurance, Taxes, Exchange.

Text-book: New Commercial Arithmetic, Moore.

BOOKKEEPING.

Aim. The specific aims of the study of Bookkeeping are, to ground the pupil in the general principles and processes of accounts; to familiarize him with business customs; to acquaint him with the forms of business; and to teach him to record business transactions. Pupils are required to do their work with the earnestness and exactness which characterize the model business man. Throughout the course the forming of habits of neatness, legibility, and strict accuracy is emphasized as essential. The course in Bookkeeping is designed to give the pupil the ability to open, keep, and close the books of any ordinary business.

Scope. The double entry system is taught, with a brief view of single entry at the end of the course.

Time allotment. Bookkeeping is taught during the second year and the first half of the third year of the Commercial Course.

FIRST HALF-YEAR.

The work of this term includes: Theoretical Bookkeeping—Journalizing, Posting, Taking Trial Balances, Taking Inventories, Making Statements, Closing Ledgers; Practical Bookkeeping—Conducting of business as proprietor and bookkeeper. Keeping of a bank account in accordance with banking customs.

SECOND HALF-YEAR.

The work of this term includes: Practical Bookkeeping (Continued): Introduction of Sales Book and Cash Book, Introduction of additional forms, such as; Notes, Discount Memorandums, Deeds, Acknowledgments, Shipping Receipts, Telegrams, Insurance Policies; Theory and Practice of Notes, Discounts, and Drafts.

THIRD HALF-YEAR.

The work of this term embraces: Practical Bookkeeping (Continued): Introduction of Partnership Business, Introduction of Invoice Book and Bill Book, Shipments and Account Sales, Closing of Books and Final Adjustments, Brief Practice in Single Entry.

Text-book: Modern Illustrative Bookkeeping, Neal.

COMMERCIAL LAW.

Aim. The aim of this study is to give training in the fundamental principles of law which are involved in business transactions. It enables one to know when and how legal obligations are incurred or legal rights acquired, either through one's own acts or those of others, and what action should be taken to maintain such rights or discharge such obligations.

Time Allotment. The work in this subject is given the second half of the third year of the commercial course.

Scope. Emphasis is laid on the important topics, and the work is made vital through a constant reference to real and hypothetical cases, state statutes, and other books.

The following topics constitute the subject matter of the term's work: Contracts, Sale of Goods, Bailments, Insurance, Credits and Loans, Guaranty, Negotiable Instruments, Agency, Master and Servant, Partnership and Joint-stock Companies, Corporations, Real and Personal Property..

Text-book: Elements of Business Law, Huffcut.

COMMERCIAL GEOGRAPHY.

Purpose. The purpose of this course is both disciplinary and practical. It is designed to stimulate individual thought and reasoning ability as well as to make the pupil acquainted with the commerce of the world in relation to production of raw materials, transportation, manufacture, markets, etc.

Method. Text-book work is supplemented by observation trips to places of commercial interest, such as the Board of Trade and important manufacturing establishments, by reference work and outside reading, and by actual examination of such materials and products as are supplied by the Educational

Museum. The important countries of the world are studied in relation to commerce, but special emphasis is laid on the United States.

Time allotment. This subject is studied the eighth half year.

Scope. The following topics studied in relation to commerce constitute the term's work: Topography and Climate, Transportation, Cereals and Grasses, Textile Fibers, Plant Products of Economic Use, Beverages, Medicinal Substances, Gums and Resins used in the Arts, Coal and Petroleum, Metals of the Arts and Sciences, Sugar and its Commerce, Forests and Forest Products, Sea Products, and Furs.

Text-book: Commercial Geography, Redway.

COURSE OF STUDY IN STENOGRAPHY.

Purpose. This course not only puts the pupil in possession of an art which will be of use to him in a practical way, but it has an educative value as well. The mind is trained to the habit of close and sustained attention, and, through eye and ear, to quick and accurate perception of minute differences. The hand is trained to prompt response. Requiring, as it does, discrimination in word meanings, in reading, and the use of correct grammatical forms in transcribing the shorthand notes, the study tends toward the right use of language.

Aim. Aside from the educative effect as a mental drill and the training of the mind, the aim of this course is to prepare young men and young women for positions as stenographers and typewriter operators.

Time allotment. The course is given throughout the third and fourth years, so as to be completed at the time the pupil has finished the requirements of the course of study.

FIRST HALF-YEAR.

The work of this term includes: Phonetic Spelling, Consonants, Vowels, Diphthongs, Position Writing, Sentence Writing, Phrase Writing, Word Signs, Coalescents, Simple Prefixes and Affixes.

SECOND HALF-YEAR.

The work of this term includes: Contractions, Word Signs, Principles continued in logical order. Copying and reading of letters in Shorthand.

THIRD HALF-YEAR.

The work of this term includes: Principles continued and thorough review, with special drill on word signs and phrasing.

FOURTH HALF-YEAR.

The work of this term includes: Dictation and Transcription, Practice, developing speed and accuracy.

Text-book: The Phonographic Amanuensis, Pitman-Howard.

TYPEWRITING.

Method. The "Touch Method," or writing without looking at the keyboard, is used from the beginning, and a method of fingering which requires the use of all the fingers is taught. The pupil is led through a gradual and logical development of the keyboard and is given a correct foundation for accurate and rapid writing. The work of this course is carefully graded, and the pupil is trained in correct, methodical habits. Besides the mental training which the pupil gets, he is prepared to do amanuensis work.

FIRST HALF-YEAR.

The work of this term includes: Position of letters on keyboard, Location of letters through sense of touch, Correct position of hands, arms, and body, Care and mechanism of typewriter, Systematic practice on graded exercises.

SECOND HALF-YEAR.

Systematic practice on graded exercises continued.

THIRD HALF-YEAR.

The work of this term comprises: Business Letters and Forms, Exercises for development of speed.

FOURTH HALF-YEAR.

The work of this term comprises: Transcription of Shorthand Notes, Addressing of Envelopes, and General Office Practice, including Letter Copying, Manifolding, Filing, Tabulating, Mimeographing.

DRAWING.

Ultimate Purpose. Drawing, with its varied exercises in pictorial representation of both natural and constructed objects, its opportunity for the development of the inventive power in discovering new combinations, and its demand for a useful ap-

plication of whatever ideas the understanding and skill may embody in concrete shape, offers excellent disciplinary training of the powers of perception, imagination, and expression. In ascertaining the peculiarities and individualities of the appearance of form as to relative proportion, relative and comparative degrees of intensity or delicacy of light, dark, shade, and color, there results a special and unique training of observation and memory. A clear and personal judgment, not of the absolute facts of things as to height, breadth, and depth, but of the exact relative appearance from the observer's point of view, demands an exercise of the perceptive and representative powers that Drawing alone can give. The possession of such understanding enables one to realize the pictorial beauty in nature and art from the artist's and the art-lover's point of view.

The ability to understand the laws of design and to grasp what essentially and legitimately decorates, and, with this as a basis, to select the elements which will combine to assume an original and attractive unity through the inventive ingenuity and applied knowledge of the designer, demands persistent and discriminating attention, imagination, and reflection.

Whenever the desire is awakened to embody an idea in concrete form for the use, instruction, or delight of school or home, and is directed intelligently and sustained until a sense of well-manifested power and productive ability is realized, the whole mental capacity is enlarged, vitalized, and made a valuable and enjoyable asset of life.

From the aesthetic and cultural point of view, the Course in Drawing is arranged to develop a deeper and finer appreciation of what constitutes that which is regarded as truly beautiful by those competent to judge; to put the pupils in possession of the knowledge of certain fundamental laws relating to beauty as manifested by the supreme instances of order and harmony found in great works of art and in nature; and to

give them a desire to read into their daily lives and surroundings a deeper meaning and a more delightful and abiding beauty.

Aim. From the practical point of view, the course aims to develop good draughtsmen, in order to facilitate the ability to put into definite shape any idea requiring graphic expression and to give reliable experience in actual designing, application of designs, and making of practical decorations for the home or market, coupled with a more trustworthy understanding of what constitutes good taste in such matters. The course seeks to quicken the pupil's sense of critical discrimination toward all forms of manufactured articles—common utensils, art products, and so forth, and to give ability to produce by means of simple mediums and materials a piece of work that will bear the impress of refined thought and feeling.

Scope. In each half-year these phases are carried out in the Drawing Course,—pictorial work, design, and construction. In the third and fourth years the history of art is given as an additional requirement.

Although there is a repetition of the kind and amount of work done each half year, it will be noted that each succeeding term demands the use of more difficult mediums and the working out of larger problems.

Pictorial work includes object and plant study, life drawing, and out-of-door sketching.

Design includes decorative and constructive design. Constructive designs for pottery, metal, etc., are made by the pupils, and the articles so made are decorated by them with their own original designs. Designs for book-covers, posters, etc., are also made, and for wood blocks and stencils, which are applied on textiles.

Construction consists in modeling objects in clay, hammering objects from sheet metal, and constructing port-folios, lamp-screens, lamp-shades, etc., out of paste-board and covering them with textiles, vellum, art canvass, etc.

Preparatory to the object work and to the out-of-door sketching, a few lessons are given in perspective, using familiar objects, such as chairs and books, interiors, and perspective problems that will aid pupils in drawing out-of-door scenes.

Studies of single objects or groups of objects are then made in full values, and sketches are made of interesting buildings or portions of buildings in the vicinity of the school.

Outline sketches are made from life, pupils working mainly for correctness of outline, good proportion, and action.

Plant study in the first year is made from simple arrangements of flowers and branches, without backgrounds. After the first year, more difficult arrangements are made, using still life in the composition, and working in full values.

Pupils taking the Domestic Science Course design the garments to be made in that department as regular drawing exercises.

EQUIPMENT AND MATERIALS.

Specially fitted rooms are used for all art work. All necessary materials, such as; pencils, paper, charcoal, water color paints, and brushes, as well as an adequate supply of leather, fabrics for stencil patterns, and copper for metal work, and all tools for same, are supplied free of charge by the school. In the arts and crafts work in leather, stencil, clay, and copper, the pupils have the privilege of purchasing the material at cost and retaining the articles designed. Supplies of flowers for design, drawing, and water color painting, and professional models for the life work, are furnished by the school. Each room has an excellent collection of still life bric-a-brac, pottery, and casts, selected for their beauty of form, color, or historic value. Books, magazines, pictures and prints relating to Architecture, Design, and Painting, as well as access to the Art Museum, furnish a means of keeping in close touch with the best in modern art and art craft movements. A stereopticon and large and valuable collections of slides illustrating the best in the History of Architecture, Sculpture, and Painting, are at the disposal of each teacher for work in the History of Art.

The following outline is arranged not according to the order in which each topic is to be presented, but according to the amount of time to be given.

Work from plants and out-of-door study must be arranged according to weather, material that can be obtained, etc., and should be done whenever conditions are favorable.

Throughout the course, growth, and development, not finished work, should be the aim.

FIRST HALF-YEAR.

1. Design:
Leading principles.
Applied, book-cover or lamp-screen.
2. Plant Study—Color and pencil.
3. Out-of-Door Study—Pencil.
4. Life—Human Figure—Pencil.
5. Object Study—Pencil.
(One study to be groups of books.)
6. Domestic Art.

SECOND HALF-YEAR.

1. Clay Modeling.
(Bowl forms and trays—no feet, no handles, no decorations).
2. Applied Design—Portfolio or lamp-screen.
3. Plant Study—Full values—Color, or pencil and color.
4. Out-of-Door Study—Pencil.
5. Life—Human Figure—Pencil.
6. Object Study—Full values—Pencil and color.
(One study to be groups, each group to contain a rectangular object.)
7. Domestic Art.

THIRD HALF-YEAR.

1. Applied Design:
Stencil design for border or frieze.
Stencil executed.
2. Plant Study—Full values—Color and pencil.
3. Out-of-Door Study—Pencil and charcoal.
4. Life—Human Figure—Pencil.
5. Object Study—Full values—Pencil and color.
(One study to be groups, each to contain a book and a beautiful piece of pottery).
6. Domestic Art.

FOURTH HALF-YEAR.

1. Clay Modeling.
(Vase-forms, no handles or feet. Simple decoration).
2. Passepartout Binding.
3. Plant Study—Full values—Pencil or color.
4. Out-of-Door Study—Pencil or charcoal.
5. Life—Human Figure—Pencil.
6. Object Study—Full values—Charcoal and color, or water color.
7. Domestic Art.
8. Book-cover Design.

FIFTH HALF-YEAR.

Art History—One single period a week for sixteen weeks.

1. Applied Design:
Leather tooling (Small piece. No designs cut out).
2. Plant Study—Full values, any medium.
3. Out-of-Door Study—Pencil or other medium.
4. Life—Human Figure—Pencil.
5. Objects—Full values—Charcoal and water color, or water color.

SIXTH HALF-YEAR.

Art History—One single period a week for sixteen weeks.

1. Clay Modeling (Handles or feet to be introduced as forming part of the decoration).
2. Plant Study—Full values, any medium.
3. Out-of-door Study—Any medium.
4. Life—Human Figure—Any medium.
5. Object Study—Full values—Charcoal, charcoal and water color, or water color.
6. Design.

SEVENTH HALF-YEAR.

Art History (Same as above).

1. Applied Design.
Leather tooling (Blotter pad, card case, purse, small book-cover, belt, etc.)
2. Metal Work (hammered).
(Match box, small tray, bowl, etc.)
3. Plant Study—Full values, any medium.
4. Out-of-Door Study—Any medium.
5. Life—Human Figure—Any medium.
6. Object Study—Full values, any medium.

EIGHTH HALF-YEAR.

Art History (Same as above).

1. Clay Modeling.
2. Plant Study—Full values, any medium.
3. Life—Human Figure—Any medium.
4. Poster—Making use of the life studies of the present term.
5. Stencil, Metal or other Applied Design.—This being the last piece in the four years' course, the student is given an opportunity to express the knowledge he has gained of beauty of form, harmony of color, and good design.

ART HISTORY.

THIRD YEAR.

I. ANCIENT AND MIDDLE AGES.

1. Assyrian and Egyptian architecture, sculpture, and painting.
2. Greek architecture, sculpture, and painting.
3. Roman architecture, sculpture, and painting.

PAGAN AND EARLY CHRISTIAN ART.

4. Saracenic architecture and decoration.
5. Byzantine and Romanesque architecture, sculpture, and painting.
6. Gothic architecture, sculpture, and painting.

FOURTH YEAR.

II. RENAISSANCE AND MODERN ART.

1. Art of the 13th and 14th centuries.
Sculpture Precursors of Renaissance.
Beginnings of Paintings.
2. Art of the 15th century.
3. Art of the 16th and 17th centuries.
4. Renaissance in Germany.
5. Renaissance in Spain.
6. Art in the Netherlands, including engraving.
7. Modern Art, English, French, German, Swedish, Dutch, American.

COURSE OF STUDY IN MANUAL TRAINING.

The purpose of the work in Manual Training, like that of other departments, is educational. While it has a distinctively practical value, it also possesses the dignity of laboratory training and holds equal rank with other studies.

Economy of time, labor, and material is taught and enforced, while special attention is given to forming habits of neatness and order and to teaching workmanlike methods.

While it is not the purpose of the course to teach any trade, the work embodies principles underlying many trades. Mastery of processes is a fundamental principle of educational value, and, therefore, great stress is laid upon those methods and processes which employ rational shop practice and conform to reputable standards of construction.

Another fundamental principle equal in educational value is the application of these processes in the construction of useful articles which embody the elements of design. From the first therefore a course in design runs parallel with the construction work.

FIRST YEAR.

Scope—Joinery. A detailed series of graded lessons is selected from the schedule by the teacher. Each exercise is first presented in the form of a working drawing made by the student himself, a blue print, or a blackboard sketch. The

mechanical process of construction is then explained by the teacher or, when necessary, illustrated before the class. Careful instruction in the grinding and care of each tool precedes its use by the student. Here, as in all the other shops, the exercises are carefully planned to embody mechanical principles and to bring into use, one after another, the various tools. The object sought is a logical advancement from the simple to the complex in mechanics and in design. A brief course in gluing, filling, staining, and varnishing supplements the lessons in design and construction.

Brief talks on the following subjects are given as the mastery of the materials, tools, and processes proceeds: Structure of Wood; Composition of Wood; Age of Trees, Decay of Trees; Parasite Plants; Timber Borers; Season for Cutting Trees; Lumbering and Milling; Drawing; Warping; Properties of Wood; Measure and Value of Wood; Preservation of Wood; Kinds and Qualities of Wood; Wood-working trades.

It will be observed that we give attention, (1) to the processes of joinery; (2) to the applications of joinery; (3) to the exercises, articles, or projects illustrating the processes; and (4) to the form of design which is applicable to these processes and exercises. We aim at correct technique, utility, good workmanship, and artistic execution. We carefully avoid those practices which would not command the respect of practical, intelligent mechanics.

Wood Carving. This division of the course, brief as it is, lends itself to applied design perhaps more readily than any other. The mechanic arts spring from the necessities of life, while the fine arts originate in the pleasure experienced in the contemplation of the beautiful, that is, in the aesthetic desire. On the one hand we find the mechanic arts demanding reason and self-restraint; on the other, we see the fine arts permitting freedom, self-assertion, and individuality. As the art side is

more prominent here, the main idea is rather to teach the application of appropriate decoration than the acquisition of skill in the execution of intricate designs.

SECOND YEAR.

Scope—Wood Turning. It is in this shop that the student first finds himself face to face with a machine; he must learn to master its details and operations; he must make it serve his ends. It offers an opportunity for developing an appreciation of grace, symmetry, and beauty of form. Heretofore, the movements of the hand have been individual and independent both as to position and time, but now these movements must become co-operative and dependent. The boy must enter into partnership with a force outside himself. In the use of the lathe he can reach results only by combining his own force with that of the revolving piece of stock on which he is working. This force is uniform, unconscious, and uncompromising. He sees before him a new condition which requires absolute conformity. This conformity demands the keenest attention and implicit obedience to the law of rotary motion. The lathe is a perfect disciplinarian. The educational quality of this co-operation with the moving force of machinery is unique and of a high order. Here skill is not only permitted, but is demanded, and as this demand comes from the unconscious motion of the lathe, it is uncompromising and inexorable. The hand at the turning tool must obey orders.

Throughout this year of the course, considerable stress is laid upon the mastery of workmanlike methods, and frequent talks upon reputable shop practice, its origin and development, supplement and round out the student's previous knowledge of woods and wood working.

In the beginning of the course the student is taught the care of the lathe, including belt lacing and the merits of the various methods of practice.

After the principle of the construction of solids of revolution has been mastered, the student passes to the more im-

portant exercises of the course, which, not only require accuracy in execution, but embody many forms of graceful and pleasing outline.

Molding. A short course in foundry work precedes the pattern making in order that the student may better understand the construction of patterns. The uses of draft, cores, and partings are thus brought out, while instruction is given in the uses of gaggers and chaplets. Elementary talks on metallurgy, foundry equipment, and the composition of the commercial alloys are given from time to time as the occasion arises.

Briefly, the work consists of instruction in the preparation and mixing of sand and facings, bench and floor moldings of simple patterns, match plate work, and the making of follow boards. Instruction is also given in the making, baking, and setting of cores; in crucible melting; in the management of the furnaces; in the preparation of charges of brass and iron; and in melting, skimming, and pouring. The course concludes with instruction in the use of rattlers and pickling vats in the process of tumbling and cleaning castings.

Pattern Making. The course in pattern making affords an opportunity for a better application of the student's knowledge of turning and molding than any other available means, moreover it engenders a more wholesome respect for the pattern maker and foundryman by affording an acquaintance with this important trade which underlies the metal working arts.

Practice is given in the use of the various wood working machines, such as: the face lathe, band saw, trimmer, and chute board, and some experience in the preparation, cutting, fitting, and gluing of pattern stock, is obtained in the making of a few well selected patterns of machine parts.

THIRD YEAR.

Scope—Forging. The course in forging consists primarily of a series of graded exercises, so designed as to bring out to the best advantage the fundamental principles underlying this

useful and fascinating mechanical art. A knowledge of the nature of the materials used, their physical and mechanical properties, is considered of the greatest importance, and much stress is laid on the proper treatment of tool steel in forging, hardening, and tempering.

Instruction is given in the following subjects: Iron, Its Source and Properties; Ores and Their Reduction; Classification of Iron and Steel; Chemical Analysis; Norway, Charcoal, Fagot, and other Irons; Bessemer, Converted, Blister, Shear, Crucible, Cast, and other Steels; Annealing, Case Hardening, Tempering, etc.

Art Craft Metal Work. A course in art craft metal work is also provided, and various articles, such as; andirons, fire sets, lamp stands, candle sticks, umbrella racks, and cabinet hardware,—hinges, drawer pulls, etc.—are made.

Instruction is given in the designing and production of bent iron and sheet metal work. The work consists in the making of such articles as brackets, lanterns, trays, letter racks, escutcheons, box corners, and hinges, out of sheet metal and thin strips of iron or copper without the application of heat. Minor attention is paid to the finishing and coloring of metals by the agency of heat and chemicals.

The tinsmithing consists in the laying out and development of the ordinary flat and curved surfaces and of intersections in conical frustums, and in the use and position of soldering strips. The rest of the work consists of instruction in soldering and the various elementary processes.

FOURTH YEAR.

Scope—Machine Shop Practice. As will be noticed, the shop work is continued throughout the entire four years of the course, and here in the last year much importance is placed upon it, not only because of the fine educational training which it provides, but also because of its technical and practical value. In the machine shop, as in no other division of the work, where the metals are wrought cold and the process is necessarily slow, patient and persistent effort by the student is certain

to be rewarded by character development and mental breadth. Again, the senses are quickened by the necessity of close observation, and the reason is schooled by the constant use of method, together with the planning of the logical sequence of the processes. Judgment is slowly but surely acquired, and the will is strengthened by the mastery of each new difficulty. In his fourth year, the student is confronted with a new condition: he is thrown more upon his own resources for the interpretation of printed instructions and descriptions, and for the determination of a plan of procedure that will lead to the successful completion of the work in hand. Here work of the teacher is supervisory and corrective rather than expository and formative.

The course in machine shop practice is divided as follows, each subject being presented in the form of "shop notes," from which the student receives the major part of his information, descriptions, and instruction: Shop Ethics, Equipment, and Regulation; Materials; Lubricants and Lubrication; Cutting Tools; Measuring and Small Tools; Screw and Pin Data; Bench, Vise, and Floor Work; Turning; Boring; Drilling; Grinding; Planing; Milling; Miscellaneous Machine Tools and Their Accessories; Shop Processes and Kinks; Power Generation and Power Transmission.

When the difference between good and bad work is estimated in thousandths of an inch, the student is at least approaching accuracy, and a valuable mental attitude is being acquired. This course is designed to quicken the senses, to train the reason and judgment, and to teach the uses of the common machine tools and the elementary principles of machine construction. Here a series of thoroughly practical exercises, involving the uses of the lathe, the planer, the shaper, the drill, the grinder, and the milling and grinding machines, is worked out by each student.

In addition to the articles made in the regular course of exercises, the majority of which are machinists' small tools, some of the following machines are frequently designed and built by the students: Jackscrews, motors, dynamos, steam and gas engines, turbines, lathes, and air compressors.

MANUAL TRAINING—JOINERY.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
First.	1. Care of Tools.	General.		
	2. Study of Woods.	General.		
	3. Gaining.	Shelving. Pigeon Holes. Furniture.	Half Joint. Brace " Lap " Dado "	
	4. Mortising.	Sash, Doors, Furniture, Framing, Bridge Work.	Mortise and Tenon Joint, Table Leg, Mortise and Tenon with Relief.	
	5. Forming.	Trays. Lamps. Book Racks. Furniture.	Pin Tray, Pen Tray, Whisk Holder, Paper Knife, Moulding, Book Rack.	Inlaying or Carving.
	6. Finishing. Staining. Varnishing.	All Interior Woodwork and Furniture.	All Exercises except the Joints.	
	7. Splicing.	Building Construction and Framing.	Various Splice Joints.	
	8. Mitering and Gluing.	Interior Finish, Mouldings, Picture Frames, Pattern Making.	Miter Box. Jewel Case. Picture Frame. Triangle. Beveled Tray.	Inlaying.
	9. Tongue and Grooving.	Flooring. Box Making. Slides. Furniture.	Book Rack. Stand. Lamp.	Low Relief Carving.
	10. Angle Joining.	Pattern Making. Furniture.	Clock Case. Tabourette. Lamp Stand.	High Relief Carving.
	11. Splining.	Round Corner Joints. Light Cabinet Making.	Glove Box. Handkerchief Box. Jewel Case.	Inlaying.
Second.				

JOINERY.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Second— Concluded.	12. Dovetailing.	Drawers. Framing. Boxes. Braces.	Dovetail Joint, Revolving Book-Rack, Chest, False Dovetail.	Chest banded with Cop- per, Inlaying, Carving.
	13. Irregular Shaping.	Pattern Making. Cabinet Making.	Paper Weight. Pin Tray. Pen Tray. Ink Stand.	Carving, Line and Surface Relief.
	14. Cabinet Making.	Furniture. Interior Woodwork and Finish.	Magazine Holder. Tabourette. "T" Square. Screens. Writing Board. Electrolifer.	Any acceptable method of Decoration.

TURNING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Third.	1. Care and Use of Lathe and Tools.			
	2. Centering, Roughing, and Straight Turning.	General.		
	3. Taper Turning.	General.	Cylinder.	
	4. Compound Curve Turn- ing.	Spindles. Bats. Columns.	Spindle.	
	5. Sandpapering, Staining, Finishing.	Spindles. Newels. Posts. All Interior Woodwork and Furniture.	Spindle. All Exercises after No. 3.	

TURNING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Third Continued.	6. Concave and Convex Turning.	Balusters. Posts. Spindles.	Stocking Darnier. Spindle. Potato Masher.	
	7. Beading and Outting Down Square.	Bed Posts, Fret Work, Spindles, Table Legs, Chair Legs, Porch Posts.	Carving Mallet. Table Leg.	
	8. Lectures on Materials.	General.		
	9. Tool Handle Turning.	All kinds of Tang Tools.	Screw Driver Handle. Turning Tool Handle. File Handle. Chisel Handle.	
	10. Boring, Fitting, and Assembling.	Loose Handles. Spindles. Balusters.	Rolling Pin. Revolving Spool Holder.	
	11. Face Plate Work.	Rosettes. Corner Blocks. Goblets.	Rosette. Goblet.	
	12. Plug Chuck Work.	Napkin Rings. Jewel Boxes. Puff Boxes. Tea Caddies.	Napkin Ring. Tea Caddy. Jewel Box.	Constructive Design, Carving and Inlaying.
	13. Face Chuck Work.	Pattern Making. Interior Finish.	Jardiniere Stand. Pin Tray. Picture Frame. Ball.	Constructive Design and Carving.
	14. Gluing and Built up Work.	Pattern Making. Cabinet Making.	Goblets. Trays. Indian Clubs. Gaveles. Dumb Bells.	Constructive Design.

MOLDING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Third and Fourth.	1. Lectures on Metallurgy, Foundry Equipment and Composition of Commercial Alloys.	Foundry Practice.		
	2. Preparation and Mixing of Sand and Facings.	Foundry Practice.		
	3. Bench Molding.	Foundry Practice.	Angle Block, Gland, Wrenches, Pipe Fittings, Pulleys, Bench Block, and Face Plate.	
	4. Making, Baking, and Setting of Cores.	Foundry Practice.	Pipe Fittings, Pulleys, Bench Block, and Face Plate.	
	5. Art Bronze Founding.	Bronzes, Medallions, Ornamental Brass and Bronze Work.	Escutcheon, Push Button Plate, Door Plate, Drawer Pull, Hinge Tail, Medallion.	Modelling in Wax.
	6. Floor Work.	Foundry Practice.	Pulleys, Pit Work.	
	7. Management of Furnace and Crucible Melting.	Foundry Practice.		
	8. Preparation of Charges of Brass and Iron.	Foundry Practice.		
	9. Skinning and Pouring.	Foundry Practice.		
	10. Cleaning, Tumbling, and Pickling of Castings.	Foundry Practice.		

PATTERN MAKING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Fourth.	1. General Considerations, Draft, Shrinkage and Finish Allowances.	General.	Angle Block, Face Plate, "V" Blocks.	
	2. Internal Draft.	Hollow and Ribbed Patterns.	Wrench, Gland, Pulleys, Gears, Cup Center, Surface Plate, Shaft Coupling.	
	3. Parted Patterns.	Patterns necessitating two or more parts.	Pipe Coupling, Pipe Return, Pipe Tee, Bench Block, Sheave Wheel.	
	4. Dowels, Fillets, and Fasteners.	Parted and Ribbed Patterns.	Surface Plate, Screw Jack, Face Plate, "V" Block.	
	5. Core Prints and Boxes.	All Cored Patterns.	Leveling Block, Pipe Fittings, Pulleys, Ink Bottle Holder, Planer Jack.	
	6. Ribbed Patterns.	Ribbed Patterns.	Screw Jack, Surface Plate.	
	7. Built Up Annular Patterns.	Cylindrical Patterns.	Pulley, Bell, Propeller Blade, Cylinder.	

FORGING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Fifth.	1. Lectures on Materials.			
	2. Management of Forge and Fire.	General Blacksmithing.		
	3. Drawing Out.	Stock Reduction.	Wedge.	

FORGING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Fifth.—Cont'd.	4. Bending.	General in Application.	Meat Hook, Spanner, Wrench Split Link, Gate Hinge, Staple.	
	5. Twisting.	Twisting.	Gate Hook, Poker.	
	6. Upsetting.	Enlarging Stock.	Bolt Heading, Angle Iron.	
	7. Splitting.	Splitting.	Fork, Drawer Pull, Grapnel.	Constructive Design.
	8. Punching and Forming.	Eyes and Small Openings.	Hasp, Chain Hook, Trace Link, Finger Plate; Hinge, Door Plate.	Constructive Design.
	9. Fullering and Swaging.	Spreading out Stock, Stock Reduction, Rounding.	Eye Bolt, Hat Hook, Door Plate, Door Knock, Shoe Scraper.	Constructive Design.
	10. Use of the Power Hammer.	Heavy Forging.	Tongs, Connecting Rod, Crank Shaft.	
	11. Use of Power Shears.	Shearing Stock.	Plates and Similar Sheet Metal Work.	Constructive Design.
	12. Welding.	Joining, Building Up.	Rings, Ring and Eye Bolts, Chains, Grapnel, Clevis.	
	13. Case Hardening and Annealing.	Hardening and Softening Surfaces of Iron.	Screw Threads, Small Castings, Small Forgings.	
	14. Lectures and Notes on Steel.	All Steel Work.	All Steel Work.	
	15. Tool Making and Dressing.	Working with Steel.	Four Hand Tools, Seven Lathe Tools.	
	16. Hardening and Tempering.	Metal Working Tools, Bushings, Rock Drills.	Four Hand Tools, Seven Lathe Tools.	
Sixth.	17. Assembling.	Putting together work composed of several parts.	Chain and Hook, Lantern Hanging, Bracket and Table Lamps.	Constructive Design.

ART CRAFT METAL WORK.
(Tin, Copper, and Iron.)

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Form of Design Applicable to Process and Exercise.
Sixth —Cont'd.	1. Lectures on the Materials and Operations.	General.	All Exercises.	
	2. Development of Flat and Curved Surfaces.			
	3. Beating Out.	Sheet Metal Work, Tinsmithing.	Tin Cup, Tea Pot, Match Safe, Stamp Box, Box Corners.	Constructive Design.
	4. Cutting and Sawing.	Stretching and Forming Sheet Metal.	Tray, Ladle, Porringer, Ink Pot.	Constructive Design.
	5. Forming and Filing.	Cutting Openings in Sheet Metal, Stock Preparation.	Escutcheons, Hinge Tails, Drawer Pulls, Box Corners, Finger Plates.	Constructive Design.
	6. Riveting and Soldering.	General.	Blotter Block.	Constructive Design.
	7. Finishing and Coloring.	Joint Making.	Match Box, Sconce, Stamp Box, Bon Bon Box, Venetian Iron Work.	Constructive Design.
		Art Metal Work.	All Exercises.	

BENCH AND VISE MACHINE WORK.

Half-year.	Process.	Application.	Exercises Illustrating the Process.
Seventh.	1. Lectures and Notes on Equipment, Shop Ethics, Small Tools, etc.	General.	Character of Instruction, Shop Ethics, Care of Self, Care of Tools, Shop Equipment, Tool Room Keeping and Regulations, Measuring and Small Tools.
	2. Lectures and Notes on Materials, Shop Processes.	General.	Metallurgy of Iron and Steel, Alloys, Bronzes, Brasses, Bearing Alloys, Screw and Pin Data, Shop Processes and Kinks.
	3. Laying Out.	Laying out Rectilinear, Cylindrical, and Drill Work.	Angle Block, Wrench, Bench Block, "V" Block, Surface Plate, Center Square, etc.
	4. Hammering and Peening.	Riveting, Chipping, Stretching Metal.	Angle Block, Rivet Joint.
	5. Power and Hack Sawing.	General.	Cutting Stock, Center Square, Calipers.
	6. Chipping.	Cutting Sprues, Fins, Irregularities and Rough Spots on Castings, Keyways and Keyseats.	Angle Block, Smoothing Castings.
	7. Filing.	Removing Tool Marks, Die Work, Small Intricate Surface Finishing, Fitting.	Angle Block, Wrench, and the Majority of the Exercises.
	8. Drilling and Reaming.	Bolt and all Kinds of Small Holes, Fitting.	Angle Block, "V" Block, Calipers, Hammer, Center Square, Planer Pin, "T" Slot Pin, Flange Coupling, Jack, Face Plate, Boring Bar, Drill Vise.
	9. Threading and Tapping.	Use of Dies in Threading, Aligning Taps, Tapping.	Angle Block, Calipers, Planer Pin, "T" Slot Pin, Flange Coupling.
	10. Fitting and Finishing.	Assembling Machinery and Machine Parts.	All Exercises.
	11. Key Fitting and Broaching.	Keyways and Keyseats, Splines, Cutting Irregular Shaped Holes.	Flange Coupling.
	12. Scraping.	Surface Plates, Ways, Guides, Housing Faces, Bearings.	Surface Plate, Ways, Gauges.

MACHINE TOOL WORK.

Half-year.	Process.	Application.	Exercises Illustrating the Process.
Seventh. —Contd.	1. Lectures and Notes on Machine Tools, Shop Equipment and Processes.	General.	Carefulness in the Shop, Machine Tool Equipment, Care of Machines, Friction, Lubricants and Lubrication, Cutting Tools, Miscellaneous Machine Tools and Accessories.
	2. Lectures and Notes on Mechanics, Devices, etc.	General.	Mechanics, Power Generating Machines, Elementary Electricity, Power Transmission, Motor Drives, etc.
	3. Straight and Taper Turning.	The great bulk of Cylindrical Work.	Arbor, Boring Bar, Sheave, Flange Coupling.
	4. Screw Cutting.	All Accurate Threading with the Lathe.	Planer Jack, Ink Bottle Holder, Face Plate, Jack Screw.
	5. Boring.	Annular Interior Surfaces, generally larger than 1 inch in diameter.	Sheave, Flange Coupling, Planer Jack, Ink Bottle Holder, etc.
	6. Drilling.	Small Holes for Bolts, etc.	Angle Block, Boring Bar, Flange Coupling, Face Plate.
	7. Grinding.	Sharpening Tools, Rapid Accurate Production of Cylindrical and other Work, Gauges.	Tool Grinding, Arbor, Drill, Reamer, Tap.
	8. Planing.	Plane Surfaces, Large and Small; Planer and Shaper Work.	Bench Block, Surface Plate, "V" Blocks, Drill Vise, Hammer.
	9. Milling.	Accurate Work for Small Tool Parts, Cutters, etc. Any Geometrical Surface.	Gear, Rack, Drill Vise, Drill, Tap.
	10. Tool Making.	Tool Room Work, Repairing Small Tools, Making Jigs, Cutters, Dies, etc.	Cutters for Boring Bars, Center Square, Drill Vise, Tap, Drill.
	11. Small Machine Construction.	General Small Shop Practice.	Class Project Work, such as; Engines, Tools, Generators, Machines, etc.
Eighth.			

COURSE OF STUDY IN MECHANICAL DRAWING.

Mechanical drawing like art and freehand drawing has had an interesting evolution. From mere thoughtless copying from a model drawing, which has little value beyond the practice given in handling instruments, the mechanical drawing course has so developed that it now combines several distinct functions. 1. It furnishes a training in the use of drafting instruments. 2. It gives the student interpretive knowledge and skill in making and applying constructional drawings, which necessarily precede all his exercises in the mechanical arts of which they form an essential part. 3. It gives practice in freehand sketching of objects to be constructed or to be remembered, a function indispensable to the practical man who needs a ready and effective medium of expression and communication in the making of plans, specifications, etc. 4. It furnishes weekly practice in constructional and decorative design, which is constantly applied in the workshop. 5. It gives a developmental course in descriptive geometry by a series of logical steps which makes this a very easy instead of a very difficult subject.

The problems and exercises outlined in the accompanying tables are worked out with comparative ease by all pupils taking the work. As this phase of mechanical drawing is not usually seen in a secondary school, and its practicability is liable to be questioned, it may not be out of place to say that we are not describing a theoretical course, but are giving only what is actually being done.

FIRST YEAR.

Since lettering occurs on all drawings, about two or three weeks are given to a small sheet of simple freehand and instrumental lettering at the beginning of the course, after which no special sheets on lettering are introduced, though many styles of instrumental lettering are given on the blue prints used in the second and third years. Following the lettering, freehand and orthographic sketches of simple geometrical objects and shop exercises are made, and from these practical working drawings are executed in ink. The

"third quadrant," which is previously explained to the pupil by means of drawing and co-ordinate planes, is used only in the first year. As soon as the pupil has acquired sufficient ability in working out orthographic projections, he is required to make assembly and detail drawings of an elementary cabinet construction or simple mechanical device. This completes the first half of the first year.

Isometric and cabinet projections are taken up during the third quarter of the first year, in which the pupil's drafting desk is drawn in cabinet projection, tinted, and grained. The last quarter of the year is given to freehand drawing in pencil from objects.

SECOND YEAR.

In the second year an elementary course in descriptive geometry,—the basis of all mechanical drawing,—is given. It is introduced by means of simple, isometric drawings, which show the relations between planes and their traces, and between points and lines and their projections upon the co-ordinate planes, in a sort of picture form, and from this they are developed into the pure orthographic form. Three sheets cover this method of treatment, after which simple, descriptive geometry problems are taken up, followed by conical sections, intersections of curved surfaces, line shading—treated in a new and somewhat rigid way, and shades and shadows.

All problems in this year are presented in incomplete blue prints which are supplemented by models when necessary. This method presents the problems with a minimum amount of laborious lettering, aids the pupil in getting started, saves time in arranging the drawings upon the sheet, saves paper, prevents the pupil from blindly copying the results required, gives the teacher an opportunity to explain the problem before the pupil begins, and furnishes the teacher something tangible to explain. This second year work is the most important in that it gives the theory and principles of mechanical drawing, and hence a broader view of the subject. It prepares the pupil for the most difficult practical drawing he may be called upon

to make and gives him an excellent preparation for a subsequent and more advanced college course in descriptive geometry.

THIRD YEAR.

1. Linear perspective. 2. (a) Machine Drawing Course. In the second quarter of the third year, the cycloid, the spirals (including the involute), and the helix are given preliminary to the drawing of such elements of machines as cams and gears, which require special treatment and depend upon these curves for their construction. These are presented in a manner similar to that employed in the second year. This arrangement makes it possible for the pupil to understand and draw almost any machine or part of the same that may be required of him. This phase of drawing completes the third year's work.

(b) Architectural Drawing Course. At the time the machine course begins, the architectural drawing course is taken up by pupils who prefer it to the machine drawing. This course consists of architectural lettering, pen-and-ink rendering, brush rendering, drawings illustrating methods of representation of plans, elevations, and details as used in architectural practice.

FOURTH YEAR.

(a) Machine Drawing Course. At the beginning of the fourth and last year, working drawings—both assembly and detail—are made from machines selected by the teacher. The last part of the year is given up to machine design.

(b) Architectural Drawing Course. At the beginning of the fourth year the classic orders are taken up while the remainder of the year is given up to the design of a house or other building, and working drawings of plans; elevations and details are required with perspective drawings in some cases.

On account of the wide difference in the ability of pupils, two courses, known as "major" and "minor," are given. The major course is as above described, while the minor course consists of the first three and a half years of the major course completed in four years.

MECHANICAL DRAWING.

Half-year	Process.	Application.	Exercises Illustrating the Process.	Design.
First.	1. (a) Lettering. (b) Design.	General. Surface Decoration.	2 Small sheets of Freehand and Instrumental Lettering. Elements of Design.	
	2. (a) Ruling Pen Practice. (b) Design.	General. Surface Decoration. Working Drawings.	1 Small sheet. Elements of Design. 7 Drawings of Geometrical Blocks and Shop Exercises.	Spotting.
	3. (a) Orthographic Projections—third quadrant. (b) Design.	Surface Decoration.	Surface Decoration of Shop Exercises.	Composition.
	4. (a) Working Drawings. (b) Design.	Shop Practices. Surface Decoration.	2 Large Sheets of Table Machine Parts. Decoration of Book Rack, etc.	Straight Line.
	5. (a) Isometric Projection and Rendering. (b) Design.	Picture and Constructive Purposes. Decoration of Joinery Exercises.	1 Large Sheet of Geometrical Forms (molding and Carving). Decoration of Glove Box, etc.	Curved Line.
	6. (a) Cabinet Projection and Rendering. (b) Design.	Picture and Constructive Purposes. Form and Surface Decoration.	1 Large Sheet of Geometrical Forms, 1 Large Sheet of Drawing Desk rendered. Designs for Low and High Relief Carving.	
	7. (a) Freehand Drawing from Machines. (Pencil.) (b) Design.	Preliminary to making of Working Drawings and Pictures. Form and Decoration of Cabinet work.	Steam Pump, Machine Tools, etc. Designs of Lamp Shades, etc. with Copper Banding.	Form and Decorative.
	8. (a) Freehand drawing from Objects. (b) Design.	Architectural Drawing. Form and Decoration of Cabinet work.	Casts of Human Anatomy and other Objects. Design of Pen Tray, etc.	Form and Decorative.
Second.				

MECHANICAL DRAWING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Design.
Third.	1. (a) Principles of Orthographic Projection. (b) Design.	General Problems in Mechanical Drawing. Form of Turning Exercise.	Representations of Planes, Points, Lines, Rotations of Lines, Special Problems. Design of Tool Handles, Napkin Ring, Tea Caddy, Jewel Boxes.	Form.
	2. (a) Intersections of Planes with Curved Surfaces. (b) Design.	Sheet Metal Work and General Problems. Form and Decoration of Turning Exercises.	Conic Sections. Design of Jardiniere Stand, Pin Tray, Picture Frame, Indian Chess, Goblets, Trays, Dumb Bells.	Form and Decorative.
	3. (a) Intersections of Curved Surfaces. (b) Design.	Sheet Metal Work and General Problems. Form and Decoration of Turning Exercise.	Intersections, Cylinders, Cones, Spheres. Designs of Escutcheons and Door Plates.	Form and Decorative.
	4. (a) Line Shading. (b) Design.	Rendering of Drawings. Form and Decoration of Patterns.	Geometrical Forms, Ring and Pulley. Design of Drawer Pulls, Hinge Tails.	Form and Decorative.
Fourth.	5. (a) Shades and Shadows. (b) Design.	Architecture. Form and Decoration of Patterns.	Geometrical Forms. Design of Pushbutton Plates, Medallions.	Form and Decorative.
	1. (a) Linear Perspective. (b) Design.	Architecture. Metal Work.	Principles, Cottage. Design of Hasps, Door Knockers, Shoe Scraper, Finger Plate, etc.	Form Design.
	2. (a) Special Curves used in Machine Parts. (b) Design.	Screws, Cambs, Gears, etc. Metal Work.	Ellipse, Cycloid, Spirals, Helix, etc. Design of Hat and Coat Hooks, Door Knockers.	Form and Decorative.
Fifth.				
Course 'A'				

MECHANICAL DRAWING.

Half-year.	Process.	Application.	Exercises Illustrating the Process.	Design.
Sixth B	3. (a) Architectural Rendering. (b) Design.	Architectural Structures and Details, Orthographic or Perspective. Metal Work.	Pen and Ink Rendering of House or Parts, Brush Rendering of Mouldings. Design of Lantern, Hanging Brackets, Table Lamps, Cups, Pots, etc.	Constructive and Decorative.
	4. (a) Plan, Elevation, and Detail Representation. (b) Design.	Working Drawings of all Architectural Work. Metal Work.	Houses with Details or Parts of same. Design of Match Safes, Box Corners, Stamp Boxes, Trays, Ladies' Fanning, Ink Pot, Blotter Blocks, Sconce, Bon Bon Box, Venetian Iron Work.	Constructive and Decorative.
Seventh B	1. (a) Classic Orders (cont.)	Architecture.	Tuscan and Doric Orders.	None.
	2. (a) Classic Orders (cont.)	Architecture.	Ionic and Corinthian Orders.	None.
	3. (a) Architectural Design.	General and Practical.	Working Drawings of Plans and Elevations for House, Store, Church, Theatre, or other Structure.	Architectural.
	4. (a) Architectural Design.	General and Practical.	Details and Perspective Drawing of Structure done in Third Quarter.	Architectural.
Eighth B				

"A" signifies Machine Drawing Course.

"B" signifies Architectural Course.

DOMESTIC ART AND SCIENCE.

Purpose. The ultimate purpose of the course in Domestic Art and Science is preparation for the practice of the art of garment making and millinery, and for the scientific and hygienic management of a household, in order to raise the work of housekeeping to the plane of intelligent care for the well-being of the home circle. The work of instruction in household arts is now assumed in part by the school, with the thought that the accumulated knowledge and experience of the race, refined and clarified by the discoveries of science, may thus be communicated to individual pupils and so afford the basis for general scientific practice. Instead of limited personal experience and meager information, racial experience and the teachings of science may thus become the possession of every household and generate active public sentiment favoring the passage and observance of measures for hygienic regulation of community affairs.

Aim. The immediate aim is to teach the selection and renovation of materials and the making of garments and millinery for all seasons and uses; the selection, preparation, and serving of wholesome, appetizing food and the avoidance of waste; the processes of cleaning apparel and dwelling, and the preservation of health by the observance of sanitary laws; the prevention of sickness and the care of the sick in the most approved manner known to science.

Scope. The course in Domestic Art is given the first and second years, five periods a week, and comprises the designing, drafting, cutting, fitting, and making of garments of all sorts; the study of materials suitable for different uses, seasons, and occasions; pressing; renovation; winter and summer millinery. Opportunity is found in this course for direct correlation with the Art Department.

The course in Domestic Science is given two years and comprises cooking and chemistry of foods, dietetics, laundering, household economics, household bacteriology, and home

nursing. Opportunity is here given for correlation with the work done in the chemistry, physics, and physiology classes.

FIRST HALF-YEAR.

Scope. The work consists of instruction in the care and use of the sewing machine, the study of cotton materials, and the making of three simple garments; drawers, petticoat, and underwaist, which require an increasing amount of measurement and fitting and the introduction of various stitches, seams, and modes of finishing. Drawers are made first because they require few measurements and no fitting. The petticoat follows and presents a slight advance in the taking of measurements and the drafting of patterns. Many of the stitches used on the preceding garment are used again. The fitting, French seams, joining of ruffle, finish of placket, and the hem are new problems. The fitting of the seams prepares for the fitting of a dress skirt later. The measurements and drafting of the underwaist are more difficult. The fitting of shoulders and underarm seams, the finish of the neck, waist, and arm-hole are in advance.

SECOND HALF-YEAR.

Scope. The work assigned is the making of a night gown and a simple dress, two garments of more difficult construction that introduce new features and apply the principles already learned. The night gown reviews the fitting of shoulder and underarm seams. The making of long seams, the finish at the neck, the sleeve draft, the putting in of sleeve, and the joining of the yoke are in advance. The first dress is made of cotton goods, because this material is easiest to handle, and calls for the application of processes used in making undergarments. For this dress a seven-gore skirt draft is made, and there are variations in the sleeve and waist drafts to suit the requirements of the design. A study is made of cotton and linen dress materials.

THIRD HALF-YEAR.

Scope. The third or fourth half-year, according to the season, is given to the making of a dress from woolen materials, which includes the review of previous principles, and to the making of winter millinery from designing to trimming, including the study of materials and of the style, lines, proportions, color scheme, and intended use. The advance work is the making of a nine-gore, circular skirt draft, and instruction is given in handling woolen material, including trimming, finish of seams, and pressing.

FOURTH HALF-YEAR.

Scope. The fourth or third half-year, according to the season, is given to the review of previous processes and to the making of a summer dress of more elaborate design, considering especially choice of material, color design, and application of principles; to the making of summer millinery including the discussion of material, styles, design, color scheme, lines, and proportions; and to the designing, choice of material, and making of a waist, with special attention to hand work.

FIFTH HALF-YEAR.

Scope. The time is divided between Cooking and Chemistry of Foods, and Laundering. One or two lessons each week are given to Cooking and Chemistry of Foods, and one lesson each week, to Laundering. The course in Cooking and Chemistry of Foods includes the theory and practice of cooking. The lessons on Chemistry of Foods are closely allied to the practice work, and the principles taught are applied in the subsequent cooking lessons. The pupil is made familiar with the equipment of the kitchen and is supplied with utensils for individual work, and is instructed in the use of heat and water. The five food principles: water, carbohydrates, proteids, fats, and mineral matter are studied successively. The first real work with foods deals with carbohydrates, including starches, sugars, cellulose, and gums, which supply heat and energy to the body.

The work in the Laundry teaches the pupil to perform the every day duties of the home in a scientific and intelligent manner, and thus dignifies household labor. It offers an opportunity for correlation with Bacteriology and Chemistry in the use of acids, alkalies, soaps, and bluing.

SIXTH HALF-YEAR.

Scope. The study of proteids, fats, and mineral matter, and the preparation of foods containing them, engage the attention. Their occurrence in meat, fish, eggs, milk, and cheese, and in peas, beans, lentils, and grains is demonstrated. The importance of fats as the source of fatty tissues and of heat is taught, and the food value of animal fats, such as; cream, butter, suet, lard, tallow, and cod liver oil, and of vegetable fats, such as olive oil and cotton seed oil, is explained. Mineral matters is shown to be requisite to health and life by its presence in the bones and teeth and in the flesh, blood, and other fluids of the body, and to be derived from meat, fish, fruits, vegetables, and grains. In the study of any food, the order observed is: first, a consideration of its uses, general appearance, and properties; second, the recognition of its physical and chemical properties in the laboratory; and lastly, the demonstration of the effect of these properties as shown in the preparation of dishes that illustrate the principles previously studied.

Household economics receives attention, and pupils are taught the care and management of the house. The special subjects considered are situation, plumbing, refrigeration, ventilation, heating, lighting, and cleaning.

SEVENTH HALF-YEAR.

The study of cooking and chemistry of foods is continued in the preparation of special articles of food. Various methods of preserving fruits, vegetables, and meats are taught and practiced.

Dietetics, which has been treated throughout the course in cooking, is made prominent, and special instruction is given as to the proper combination of foods in correct proportion, considering actual conditions of health, age, climate, and occupation.

Household bacteriology is given once each week and includes a study of microscopic bacteria, fermentation, moulds, and yeasts.

EIGHTH HALF-YEAR.

Scope. The study of cooking is continued in the preparation of special dishes and menus. Home nursing is taught in connection with invalid and infant diet. Simple home treatment in cases of illness and emergency is discussed and demonstrated. The invalid cookery applies the previously acquired knowledge of food values in the planning and preparation of the proper diet for special cases. The study of infant diet includes the preparation of the food and the feeding of infants at different ages and under different conditions.

DOMESTIC ART.

Half-year	Study of	Application	Illustrations of Process	Form of Design Applicable to Process and Exercise.
First.	1. Care and use of machine.	General.	Use of attachments.	
	2. Use of tools.	General.		
	3. Study of cotton materials and trimmings.	General.		
	4. Design.	Drawers.	Taking measurements.	Proportion and line.
	5. Draft.	Drawers and yoke.	Placing pattern; seams, tucks, hem.	Featherstitching.
	6. Cutting of garment.	Drawers and yoke.	Tucking, ruffle, seams, placket, belt, finish.	
	7. Making of garment.			
	8. Design.	Petticoat and underwaist.	Taking measurements.	Proportion and line.
	9. Draft.	Petticoat and underwaist.	Placing pattern; tucks, seams.	Featherstitching.
	10. Cutting of garment.	Underwaist.	Shoulder and under-arm seams, placket, tucks, ruffle, belt, hem, finish.	Featherstitching, French knots, French and eyelet embroidery.
	11. Fitting of garment.	(a) Petticoat.	Seams, trimming, finish.	
	12. Making of garment.	(b) Underwaist.		
Second.	13. Design.	Nightgown.	Measurements; yoke, body, sleeve.	Proportion and line.
	14. Draft.	Nightgown.	Laying on pattern.	
	15. Cutting of garment.	Nightgown.	Shoulder and under-arm seams.	
	16. Fitting of garment.	Nightgown.	Seams, placket, finish at neck, arms-eye, hand, bottom, putting in sleeve, trimming, finish.	Featherstitching, French knots, French and eyelet embroidery.
	17. Making of garment.	Nightgown.		
	18. Study of wash materials.			

DOMESTIC ART.

Half-year	Study of	Application	Illustrations of Process	Form of Design Applicable to Process and Exercise
Second— Continued	19. Design. 20. Draft. 21. Cutting.	Simple dress. Waist, sleeve, seven-gore skirt. Waist, sleeve, skirt.	Measurements. Laying on pattern allowing for seams, plaits, tucks, hem. Waist seams, skirt seams. Seams; variation and finish, placket, belt, finish. Seams, trimmings, putting in sleeves, finish.	Proportion and line.
	22. Fitting. 23. Making.	(a) Skirt. (b) Waist.		
	1. Study of materials.			Styles, lines, proportion.
Third or Fourth, according to season.	2. Design. 3. Draft. 4. Cutting. 5. Making. 6. Covering.	Frame and bandeaux. Buckram frame and bandeaux. Frame with velvet, silk, braid, or felt.	Measurements. Laying on pattern. Cutting out, wiring, covering wires, stitches. Plain, narrow and wide binding, corded edge, puffed edge. Plain crown, puffed crown. Bow-making, facings, milliner's fold, trimming.	
	7. Trimming. 8. Finish. 9. Renovation of materials.	Linings, Felt, silks, velvet, feathers, straw, flowers, ribbons.		Color, style, lines.
	10. Study of woollen materials, trimmings.			
	11. Design. 12. Draft.	Dress. Waist, sleeve, circular and nine-gore skirt	Measurements. Laying on pattern, seams in sleeve, skirt, waist. Shoulder and under-arm seams.	
	13. Cutting. 14. Fitting. 15. Making.	Finish.		

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DOMESTIC ART.

Half-year	Study of	Application	Illustrations of Process.	Form of Design Applicable to Process and Exercise.
Fourth or Third, according to season.	16. Study of Materials.			
	17. Design.			
	18. Draft.			
	19. Making.			
	20. Hat Making.	Hat. Wire frame.	Summer hat.	Style, color, lines.
	21. Trimming.		Measurements.	
	22. Finish	Lining.	Cutting out, covering. Tucking, shirring of chiffon, net, lace, sewing of straw. Bow-making, trimming.	
	23. Study of fine materials and trimmings.			
	24. Design.			
	25. Draft.	Dress, more elaborate.	Application of previous principles.	
	26. Cutting out.			
	27. Fitting.			
	28. Making.			

DOMESTIC SCIENCE.

Half-year	Study of	Application	Illustrations of Process	Chemistry of Foods
Fifth	Kitchen.	General.	Arrangement.	
	Individual Equipment.	Abbreviations of measuring.	T, t, c, or., pt., qt., lb., spk., Level.	
	Heat.	Fuels.	Coal, gas, electricity.	
	Water.	Range.	Coal, gas, electric.	
Fifth (and through-out the rest of the course).		Cooking.	Points of temperature.	
		Beverages.	Tea, Coffee, fruit drinks.	
	Carbohydrates.	Cereals.	Preparation, cooking, combinations with other food.	Cooking of starch.
		Vegetables.	Classification, seasons, cost, preparation.	Digestion of starch.
Sixth (and through-out the rest of the course).		Sugar.	Classification, source, adulteration.	Cooking of sugar.
		Flour Mixtures.		Fermentation.
	Proteids.	Meats.	Flour, leavens, ingredients, cooking.	Digestion.
		Fish.		Action of leavens.
		Poultry.	Cuts, preparation.	
		Eggs.	Classification, seasons, preparation, cooking.	
		Milk.	Classification, seasons, selection, preparation, cooking.	
		Vegetables.	Composition, tests, preservation, cooking.	Formation of lactic acid.
	Fats and oils.	Vegetables.	Analysis, adulteration, care, milk products.	
		Animal.	Source, preparation for market, Rendering, preservation.	Combustion of fats.
	Mineral matter.	Vegetable.	Cooking in fats.	
		Animal.	Source, kinds, use of.	

DOMESTIC SCIENCE.

Half-year	Study of	Application	Illustrations of Process
Seventh.	Preserving.	Fruits. Vegetables. Meats. Preserving agents.	Canning, preserving, jelly making, pickling, drying, salting, smoking, cold storage. Heat, sugar, salt, vinegar, spices, cold.

DIETETICS.

Half-year	Study of	Application	Illustrations of Process
Seventh.	Food.	Proteids. Carbohydrates. Fats. Mineral matter.	Proper combinations of food principles in relations to individual, considering age, climate, and occupation.

FANCY COOKERY.

Half-year	Study of	Application	Illustrations of Process
Eighth.	Chafing dish cookery. Fancy dishes. Frozen desserts. Menus.	General. Meats, fish, vegetables, salads, desserts. Ices, sherbets, creams. Breakfast, luncheon, dinner, teas and receptions.	

DOMESTIC SCIENCE — LAUNDRY WORK.

Half-year	Study of	Application	Illustrations of Process
Fifth.	Location of laundry.	Part of house.	
	Equipment of laundry.	General.	
	Care of laundry.	Irons, boiler, washboards, wringer, ironing board.	Process. Cleaning materials.
	Laundry materials.	Soap, borax, ammonia, bluing, stiffening agents.	Kinds, manufacture, uses, source.
	Removal of stains.	Fruit, tea, coffee, chocolate, ink, rust, grease, mildew, etc.	Agents, process.
	Disinfection of clothes.	General. Disease. Infectious. Contagious.	Agents, process.
	Washing and ironing.	Sorting of clothes. White clothes. Colored clothes. Flannels. Hosiery.	Table, bed, body linen, kitchen towels, dusting and cleaning cloths, clothes, flannels, hosiery. Soaking, washing, boiling, rinsing, bluing, starching, drying, sprinkling, ironing, airing, folding. Setting colors, restoring colors, washing, rinsing, bluing, starching, drying, sprinkling, ironing, airing, folding. Washing, rinsing, drying, pressing. Setting color, washing, rinsing, drying, pressing.

HOUSEHOLD ECONOMICS.

Half-year	Study of	Application	Illustrations of Process
Sixth.	Situation of house.	Site, soil.	
	Household plumbing.	Air, water and drain pipes.	Faucets, traps, joins.
	Refrigerator.	Porcelain, glass, zinc, etc.	Daily care, cleaning.
	Ventilation.	Fire place, windows, transoms.	
	Heating of house.	Grate, stove, furnace.	Wood, coal, gas. Study of parts of stove and furnace. Regulation and care.
	Lighting of house.	Candles, lamps, gas and electric fixtures.	Kerosene, gas, electricity.
	Cleaning.	Woods, walls, windows, coverings, floor coverings, metals, glass, dishes.	Sweeping, dusting, cleaning agents, method.

DOMESTIC SCIENCE—HOUSEHOLD BACTERIOLOGY.

Half-year	Study of	Application	Illustrations of Process
Seventh.	Microscopic bacteria	General. Source, form, growth, motion, kinds. Use in arts. Fermentation. In dairy. In agriculture. As scavengers.	Simple, compound. Linen, hemp, sponges, leather, etc. Helpful, harmful. Milk, butter, cheese. Fertilizers, sprouting of grains.
	Moulds.	Source, kinds, growth, use.	Helpful, harmful.
	Yeasts.	Source, kinds, uses, growth, fermentation.	Wild, prepared.

HOME NURSING.

Half-year	Study of	Application	Illustrations of Process
Eighth.	Emergency cases.	Burns, scalds, wounds, sprains, dislocations, fractures, fainting, drowning, asphyxiation, poisons.	Agents and methods used.
	Simple treatment for disease.	Acute. Chronic. Contagious. Infectious. General.	Agents and methods used. Invalid cookery. Infant cookery.
	Children's diseases.		

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